iPECS

iPECS UCP

Hardware Description & Installation Manual

Regulatory Information

Before connecting the iPECS UCP to the telephone network, you may be required to notify your local serving telephone company of your intention to use "customer provided equipment". You may further be required to provide any or all of the following information:

PSTN line Telephone numbers to be connected to the system

- Model name: iPECS UCP
- Local regulatory agency registration number: consult local Ericsson-LG Enterprise representative
- Ringer equivalence: 0.6B
- Registered jack: RJ-45 & RJ-11

This equipment complies with the following regulatory standards, that is, the safety requirements of EN60950-1, and the EMC requirement of EN55032 and EN55024.

If the telephone company determines that customer provided equipment is faulty and may possibly cause harm or interruption in service to the telephone network, it should be disconnected until repair can be affected. If this is not done, the telephone company may temporarily disconnect service.

The local telephone company may make changes in its communications facilities or procedures. If these changes could reasonably be expected to affect the use of iPECS eMG80 or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

IPECS eMG80 complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

European Union Declarations of Conformity

Ericsson-LG Enterprise Co.,Ltd. declare that the equipment specified in this document bearing the " CE" mark conforms to the European Union Radio Equipment Directive(RED, 2014/53/EU), including the Electromagnetic Compatibility Directive(EMCD,2014/30/EU) and Low Voltage Directive(LVD, 2014/35/EU). Copies of these Declarations of Conformity (DoCs) can be obtained by contacting your local sales representative.

FCC/CSA Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 /RSS-GEN of the FCC/IC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference; and (2) This device must accept any interference received, including interference that may cause undesired operation.

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations, CAN ICES-3(A)/NMB-3(A)

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information contact your Local Industry Canada office.

⚠ <u>CAUTION</u>

Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

ATTENTION: Tout changement ou modification dans la construction de cet appareil qui ne sont pas expressément approuvé par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser l'équipement.

⚠ **WARNING**

This is a class A product. In a residential environment, this product may cause radio interference in which case the user may be required to take adequate measures.

⚠ **WARNING**

This equipment generates and uses R.F. energy, and if not installed and used in accordance with the Instruction Manual, it may cause interference to radio communications. It has been tested and found to comply with the appropriate limits for a telecommunication device. The limits are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area could cause interference, in which case the user, at their expense, will be required to take whatever measures may be required to correct the interference.

<u>Disposal of Old Appliance</u>

When the displayed symbol (crossed-out wheeled bin) is adhered to a product, it designates the product is covered by the European Directive 2012/19/EC.

- All electric and electronic products should be disposed of only in special collection facilities appointed by government or local/municipal authorities.
- The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.
- For detailed information about disposal of your old appliances, please contact your city office, waste disposal service or the place of product purchase.

Revision History

ISSUE	DATE	DESCRIPTION OF CHANGES
1.0	Mar., 2014	Initial Release
1.1	June, 2014	S/W version 1.1.x. - Updated the minor content.
1.2	July, 2015	S/W version 1.2.x. - Updated the capacity of UCP100 port. - Added Checking power cord. - Added LIP-9000 series.
1.3	Jan., 2016	S/W version 2.0.x. - Added VCIM gateway. - Added GDC-480H, LDP-9200 series, and LIP-9071.
1.4	April, 2016	S/W version 2.1.x. - Updated the minor content.
1.5	Dec., 2016	S/W version 2.2.x. - Added WTIM24.
1.6	Mar., 2019	S/W version 3.5.x. - Updated Module & Phone Power Requirements - General Update (Style, Chart, Fonts)
	Apr.,2019	- Updated LIP-9048 DSS installation
1.7	Dec., 2019	S/W version 4.0.x. - General Update (Style, Chart, Fonts)
	Feb., 2020	- Added 1000i Series
1.8	Sep., 2020	S/W version 4.1.x. - Applied S/W version 4.1.x
	Jan., 2021	- Added the Gateway Default Address
1.9	Mar., 2021	S/W version 5.0.x. - Applied S/W version 5.0.x - Added 1080i,1048idss,1048ilss - Added "Short Caution" for DTIM24
2.0	Jan., 2022	S/W version 6.0.x. Applied S/W version 6.0.x(General Update)

Table of Contents

1 Introduction

1.1   Important Safety Instructions

1.1.1   Safety Requirements

- When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and other personal injury, including the following:

- Please read and understand all instructions.

- Follow all warnings and instructions marked on the product.

- Unplug this product from the wall outlet before cleaning. A slightly damp cloth should be used for cleaning; do not use liquid or aerosol cleaners.

- Do not use this product near water, such as bathtub, washbowl, kitchen sink or laundry tub, a wet basement, or near a swimming pool.

- Do not place this product on an unstable stand or table. The product may fall, causing serious damage to the product or serious injury.

- Slots and openings in the Cabinet or Module and the back or bottom are provided for ventilation, to protect it from overheating, these openings must not be blocked or covered.
  The openings should never be blocked by placing the product on a bed, sofa, or other similar surface. This product should never be placed near or over a radiator or other heat source. This product should not be placed in a built-in installation without proper ventilation.

- This product should be operated only from the type of power source indicated on the product label. If you are not sure of the type of power supply to your location, consult your dealer or local power company.

- Do not allow anything to rest on the power cord. Do not locate this product where the cord could be abused by people walking on it.

- Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.

- Never push objects of any kind into this product through Cabinet or Module slots or connectors as they may touch dangerous voltage points or short out parts that could result in a risk of fire, electric shock or product failure. Never spill liquid of any kind on the product.

- To reduce the risk of electric shock, do not disassemble this product. Instead, take it to a qualified person when service or repair work is required.
  Opening or removing covers may expose you to dangerous voltages or other risk. Incorrect reassemble can cause electric shock when the appliance is subsequently used.

- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
  - When the power supply cord or plug is damaged or frayed.
  - If liquid has been spilled into the product.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally by following the operating instructions.

Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

- If the product has been dropped or the Cabinet or Module has been damaged.
- If the product exhibits a distinct change in performance.

- Avoid using a telephone during an electrical storm. There is a remote risk of electric shock from lightning.
- In the event of a gas leak, do not use the telephone near the leak.

1.1.2   Precaution

- Keep the system away from heating appliances and electrical noise generating devices such as florescent lamps, motors and televisions. These noise sources can interfere with the performance of the iPECS UCP System.
- This system should be kept free of dust, moisture, high temperature (more than 40 degrees) and vibration and should not be exposed to direct sunlight.
- Never attempt to insert wires, pins, etc. into the system. If the system does not operate properly, the equipment should be repaired by an authorized Ericsson-LG Enterprise service center.
- Do not use benzene, paint thinner, or an abrasive powder to clean the Cabinet or Module. Wipe it with a soft cloth only.
- This system should only be installed and serviced by qualified service personnel.
- When a failure occurs, which exposes any internal parts, disconnect the power supply cord immediately and return this system to your dealer.
- To prevent the risk of fire, electric shock or failure of the system, do not expose this product to rain or any type of moisture.
- To protect the internal components from static electricity, discharge body static before touching connectors and/or components by touching ground or wearing a ground strap.
- To reduce the risk of fire, use only No. 26 AWG or larger (e.g., 24 AWG) UL Listed or CSA Certified Telecommunication Line Cord.
- The Power supply cord is used as the main disconnect device. Ensure that the socket-outlet is located, installed near the equipment and is easily accessible.
- A supplementary equipment-earthing conductor is to be installed between the product or system and earth, that is, in addition to the equipment-earthing conductor in the power supply cord.
- Disconnect the Telecom connection before disconnecting the power connection prior to relocating the equipment and reconnect the power first.
- This system is equipped with an earthing contact plug. For safety reasons this plug must only be connected to an earthing contact socket that has been installed according to regulations.

<u>WARNING</u>
Replace batteries only with the same or equivalent type recommended by the manufacturer. There is a risk of explosion if batteries are replaced with an incorrect type. Dispose of used batteries according to the manufacturer's instructions and local disposal requirements.

1.2   About This Manual

This document provides general information covering the description and installation of the iPECS UCP System hardware. While every effort has been taken to ensure the accuracy of this information, Ericsson-LG Enterprise makes no warranty of accuracy or interpretations thereof.

The document is divided into eight (8) sections as described in the following.

Section 1: Introduction
This section introduces important safety information and the manual.

Section 2: System Overview
This section provides general information on the iPECS UCP System, including the system specifications and capacity

Section 3: iPECS UCP Hardware Description
This section describes the hardware components of the iPECS UCP.

Section 4: Installation overview
This section gives detailed instructions for planning the installation site and procedures to install the iPECS UCP System.

Section 5: Module Mounting Hardware Installation
This section describes installation of the Module mounting hardware with step-by-step instructions.

Section 6:Module Installation and Wiring
This section provides instructions on wiring the individual Modules, installing Module option boards, and wiring for the Main Cabinet, as well as Miscellaneous connections, Earth Grounding and Battery Backup.

Section 7: Terminal Installation and Wiring
This section describes the various terminals, maximum wiring distance, and other device connection information for the terminals.

Section 8: Open Source Software Notice
This section provides information on open source software

2 System Overview

2.1   iPECS UCP Introduction

iPECS UCP is Ericsson-LG Enterprise's Internet Protocol (IP) Enterprise Communications Solution Unified Communication Platform designed to meet the telecommunication needs of the small to medium sized business. iPECS UCP uses advanced packet voice and IP switching technology, which is combined with a rich feature content, to set a new standard in Voice over IP (VoIP) systems.

iPECS UCP consists of a family of intelligent modules, which are interconnected over an Ethernet LAN, easing the installation process and eliminating the need for an expensive back plane. A variety of modules are available including analog and digital network access gateways, which connect to the Public Switched Telephone Network (PSTN), ISDN or public and private VoIP networks. iPECS Ethernet switches (ES8G/ES8GP) provide the LAN connections for other iPECS UCP modules in the same form factor as the standard iPECS UCP modules for a clean consistent in-cabinet installation. The ES8GP incorporates Power over Ethernet (PoE) to support "power-feed" to connected LIP Phones. LIP Phones provide the user simple access to the many features and functions of the iPECS UCP.

The modules, which make up the iPECS, can be installed in a Main Cabinet. The cabinet can be desk, 19" rack, or wall mounted, as best fits the user needs and equipment room. Each of the system's modules is powered from a PSU, which converts 100-240 VAC to 48 VDC. In lieu of the cabinet installation, the modules can be shelf (bookend) mounted, in which case, each module is separately powered from an AC/DC adapter, which converts 100-240 VAC to 48 DC for use by the module.

iPECS supports a variety of iPECS LIP Phones Ericsson-LG Enterprise digital terminals, standard VoIP phones (SIP and H.323 V3) and analog single line devices. With the LIP and LDP digital Phones, commonly used features are activated by selection of a single button. Additionally, most functions can be accessed from any telephone by dialing specific codes. For LIP and LDP digital Phone users, these "dial codes" may be assigned to Flexible buttons for easy access. In addition to the LIP Phones, optional LIP DSS Consoles are available to expand the number of Flexible buttons available to the user.

iPECS UCP provides an environment rich in features beyond today's traditional circuit switched telephone systems. In addition to a fully featured voice intercom, the iPECS UCP incorporates enhanced messaging, basic Auto Attendant/Voice Mail, Least Cost Routing, and Automatic Call Distribution, as well as Web based Admin, and VoIP network interface. iPECS UCP incorporates an interface to the iPECS Applications Service Provider, a TAPI 3.1 TSP/MSP. The Application Service Provider links the iPECS UCP to advanced Computer-Telephony iPECS and third party applications. In addition to the iPECS Auto Attendant/Voice Mail and iPECS Unified Messaging applications developed by Ericsson-LG Enterprise, third party TAPI 3.1 application support is provided. Standard Unified Communications Services (UCS) are supported through the UCS Client providing enhanced communications, presence and collaborative services. Premium UC services are supported through the installation of the optional UC server. An optional Network Management Server (NMS) software package is available allowing monitoring and management of environments encompassing multiple iPECS installations.

By employing packet voice and IP switching, the iPECS infrastructure can be employed for or can share the enterprise data network. Further, since all modules and terminals have a unique IP address, they can be

moved anywhere with access to a broadband network that can connect to iPECS and function without the need for "re-programming". The use of the single common infrastructure and ability to easily install or relocate modules and telephones results in significant savings at installation and over the life of the system.

The reliability, extensive feature content, the ability to support present and future iPECS applications and the capability to use an array of modules and instruments, permit the iPECS to be tailored to meet the short and long-term needs of the most demanding customer requirements.

2.2   iPECS UCP Network Connection

Figure 2.2-1 below is a diagram of the various modules and terminals available for integration into an iPECS UCP controlled network.
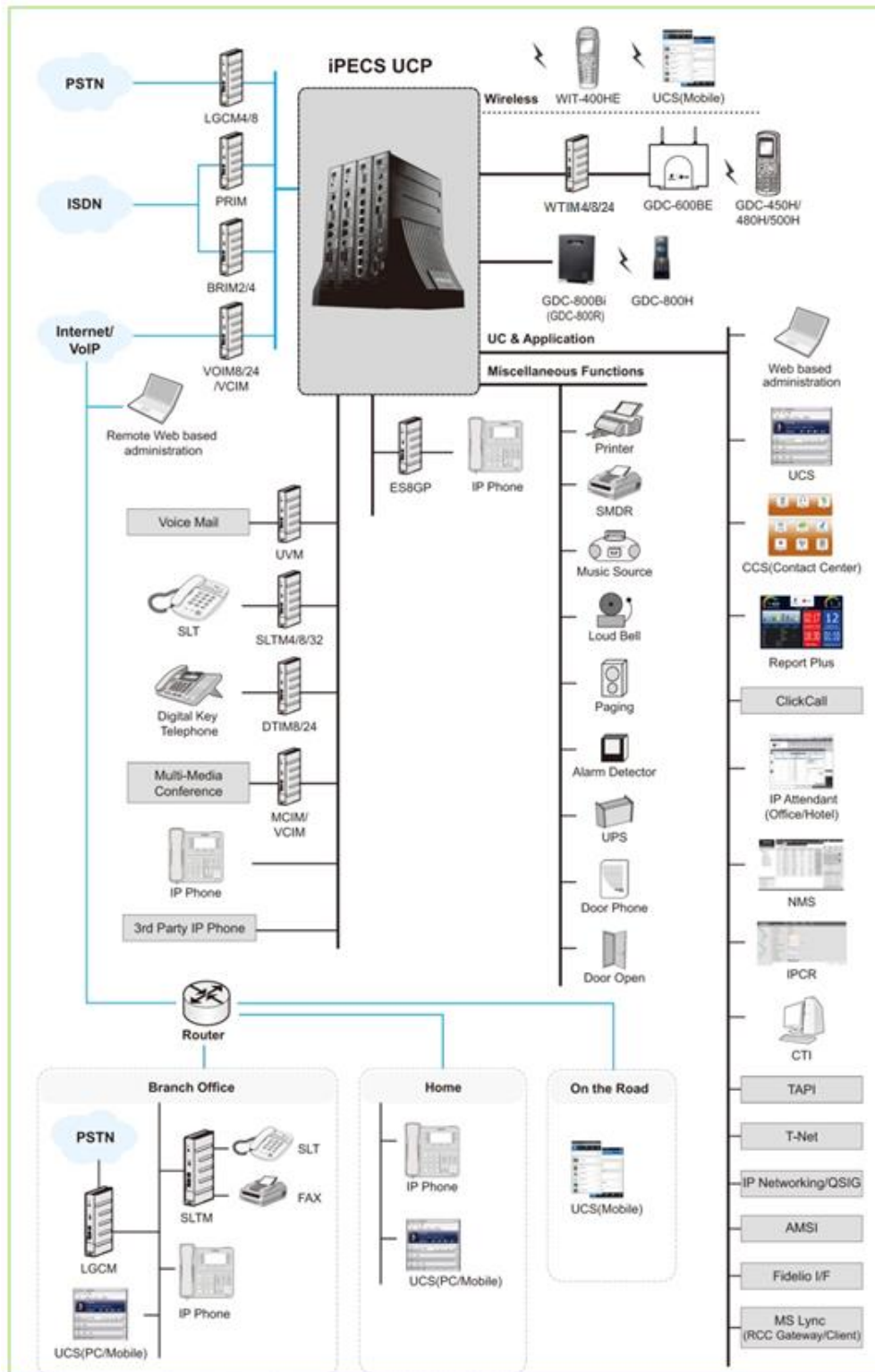
Figure 2.2-1 iPECS UCP Network diagram

Table 2.2-1 iPECS UCP Gateway Default IP Address

No	ITEM	Default IP Address	No	ITEM	Default IP Address
1	BRIM	10.10.10.253	7	MCIM	10.10.10.245
2	T1/PRI/SLTM4	10.10.10.252	8	WTIM	10.10.10.242
3	DTIM8/24	10.10.10.250	9	UVM	10.10.10.246
4	LGCM4/8	10.10.10.249	10	VOIM8	10.10.10.244
5	SLTM8	10.10.10.248	11	VOIM24/VCIM	10.10.10.243
6	SLTM32	10.10.10.247			

2.3   Hardware Components Chart

The following table provides a description of the hardware components that make-up iPECS UCP. All of the Modules are connected over standard Ethernet LANs. Multiple options permit module installation in a cabinet, bookshelf mount, or individual mounting.

Table 2.3-1 iPECS Modules

	ITEM	DESCRIPTION
1	UCP100	Unified Communications Platform Server 100, Basic 50, Up to 199 ports
	UCP600	Unified Communications Platform Server 600, Basic 100, Up to 600 ports
	UCP2400	Unified Communications Platform Server 2400, Basic 600, Up to 2400 ports
	• UCP-COIU4	4 ports Central Office Interface Unit daughter board for UCP100
	• UCP-BRIU2	2-port Basic Rate Interface Unit daughter board for UCP100
	• UCP-BRIU4	4-port Basic Rate Interface Unit daughter board for UCP100
2	VOIM8	Voice Over IP Gateway Module, 8 channels
3	VOIM24	Voice Over IP Gateway Module, 24 channels
4	VCIM	VoIP and Conference Interface Gateway Module, Basic 64 DSP channels, Up to 128 DSP channels with software license. (Default 31 VoIP or 62 Conference, Maximum 63 VoIP or 126 Conference)
5	LGCM4	Loop Start CO gateway Module, 4 ports
6	LGCM8	Loop Start CO gateway Module, 8 ports
	• CMU1216	4-channel Call Metering Unit for LGCM, 12 or 16KHz, Polarity Reversal
	• CMU50PR	4-channel Call Metering Unit for LGCM, 50Hz, Polarity Reversal
7	BRIM2	BRI gateway Module, 2 port ISDN "T" Interface (2B+D)
8	BRIM4	BRI gateway Module, 4 port ISDN "T" Interface (2B+D)
9	PRIM	PRI gateway Module, 1 port, 24 (23+1) or 32 (30+2) channels
10	DTIM8	Digital Terminal Interface gateway Module, 8 ports
11	DTIM24	Digital Terminal Interface gateway Module, 24 ports
12	SLTM4	Single Line Telephone gateway Module, 4 ports
13	SLTM8	Single Line Telephone gateway Module, 8 ports
14	SLTM32	Single Line Telephone gateway Module, 32 ports
15	UVM	Unified Voice Mail Interface Module, Up to 16 Channels/200 Hours
16	MCIM	Multi-Media Conference Module (up to 32-party voice)
17	WTIM4	Wireless Terminal Interface gateway Module, 4 ports
18	WTIM8	Wireless Terminal Interface gateway Module, 8 ports

	ITEM	DESCRIPTION
19	WTIM24	Wireless Terminal Interface gateway Module, 24 ports
20	ES8G	8 +1 Port switch, 10/100/1000 Base-T Ethernet interface
21	ES8GP	PoE Switch, 8 +1 Ports, 10/100/1000 Base-T Ethernet interface
22	AC/DC Adapter –G-	AC/DC Adapter for standard iPECS gateways & modules, (48VDC, 0.8A)
23	DHLD	Desk mount Holder for module
24	DHE	Desk mount Holder Extender, one (1) required for each Module
25	WHLD	Wall mount Holder for module
26	MCKTE	Main Cabinet Kit Enhanced
27	WBRKE	Wall mount Bracket Kit for Enhanced Main Cabinet
28	1U-RMB	1U Rack mount Bracket for gateway Modules

2.4   System Specifications

2.4.1   System Capacity

Table 2.4.1-1 System Capacities

ITEM	UCP100	UCP600	UCP2400	Remark
Main Cabinet		10 Slots		1 slot used by the PSU
System channels, basic	50	100	600	
• maximum	199	600	2400	w/License
Stations	199	600	2400	Total stations and Lines cannot exceed the available System channels
CO/IP Lines (external network channels incl. VoIP)	199	600	998	
UCS Standard Clients				
• Registrations	100	200	400	
• Simultaneous	100	200	400	
UCS Premium Clients				
• Registrations	199	600	2400	
Server Redundancy	No	Yes	Yes	Supports local and remote redundancy
Cabinet Power Redundancy		Yes		
Integrated Telephony ports[1]				Two FXS ports are equipped as standard in the UCP100 module; an optional CO/BRI line unit may be equipped or installed.
• standard	2 FXS (SLT)	None	None	
• optional	4 CO, or 2 BRI or 4 BRI Lines			
Max. WTIM4/8 modules		30		
Max. WTIM24 modules		10		
Max DECT phones for WTIM4/8	192	192	192	
Max DECT phones for WTIM24	254	254	254	*Supports GDC-

Table 2.4.1-1 System Capacities

ITEM	UCP100	UCP600	UCP2400	Remark
				480H/500H
VoIP Switch channels, [*2&3] • Built-in basic • Built-in maximum • System Maximum	 2-6 16 199	 6 24 600	 0 0 998	w/License (8ch increment) w/VOIM and VCIM
VoIP DSP channels, • Built-in max	 4	 6	 0	VoIP DSP channels can be assigned to the MCIU, 2 VoIP = 4 Conf channels. For UCP100 see Note 1.
Multi-party Conference Unit (MCIU) channels	6/10/14/18	6/18	0	
Maximum MCIMs	30			
Max SIP channels	100	600	1200	
VSF[*4]	8-Ch./4 Hrs.	8-Ch./6Hrs.	NA	
	14 Hours	16 Hours	NA	w/License
UVM capacity, basic • maximum	8 Channels at 50 hours 16 Channels at 200 hours			w/License
UVM per system	100			
Attendants	50			
Serial Port (RS-232C)	1			
USB Host port	1			
Alarm/Doorbell input	1	2		
External Control Relays	1	4		
Music Source Inputs (Ext)	1			
Power Fail Circuit	1	4		
External Page zones	1	2		
Internal Page Zones	100			
System Speed Dial	12,000			
System Speed Dial Zones (Groups)	50			
Station Speed Dial, per Station	100			
Total Station Speed Dial	24,000			
Call park	200			
Last Number Redial	10 (23 digits)			
Save Number Redial	1 (23 digits)			
Standard DSS Consoles/Station	9			
Serial DSS - System	500			
Serial DSS - Station (LIP-8000)	4			
Serial DSS - Station (LIP-9000)	1			
SMDR buffer	30,000			

Table 2.4.1-1 System Capacities

ITEM	UCP100	UCP600	UCP2400	Remark
CO Line Groups	200			
Station & Hunt Groups	200			
Station & Hunt Group Members	200			
Pickup Groups	200			
Pickup Group Member	2,400			
Personal Groups	1200			
Conference Group - System	160			
Conference Group - Station	100			
Executive/Secretary pairs	100			
Authorization Codes	5200 (Station:2400/System:2800)			
Transparent Networking Table	100			
Redundancy	N/A	Yes		
Flex DID Table	10,000			
MSN table	2,400			
DID Digits Analysis	4			
Tenancy (ICM) Groups	100			
ICLID table	500			
BHCC	54000(15CPS)			

NOTE

1) The iPECS UCP100 is equipped with two (2) FXS ports, and one of several built-in CO Line units may be factory or field installed.
   - 4 analog CO Lines (UCP-COIU4), uses two (2) VoIP DSP channels
   - 2 BRI Lines, 2B+D each, (UCP-BRIU2), uses two (2) VoIP DSP channels
   - 4 BRI Lines, each 2B+D, (UCP-BRIU4), uses four (4) VoIP DSP channels

   Note the built-in PSTN interfaces require dedicated DSP resources. These DSP resources reduce the maximum VoIP DSP resources available shown in the above chart.

2) The built-in VoIP Switching channels implement agent and packet relay functions. Remote device and network interfaces send IP traffic and signaling to the VoIP channel, which forwards traffic to the appropriate local iPECS device. The VoIP Switching channel also forwards multi-cast packets to the remote end-points and local non-iPECS devices. Only g.711 codec is allowed unless there is an available VoIP DSP channel.

3) The number of VoIP Switching channels can be increased to the maximum with license installation.

4) Approximately 35 minutes (16 Mbytes) of the VSF and UVM memories are used to provide basic system prompts, the remaining memory can be used for announcements and voice message storage. Note the built-in VSF supports the g.711 Codec only; the UVM supports g.711, g.729, g.723, and g.722 Codecs.

5) With PFT enable within the equipment the system will route to the assigned SLT port allowing for emergency access if not provisioned the equipment will be inoperable when mains power fails.

2.4.2   Dimension and Weight

Table 2.4.2-1 Dimensions and Weight

ITEM	HEIGHT (mm/in)	WIDTH (mm/in)	DEPTH (mm/in)	WEIGHT (Kg/lbs.)
Standard Gateway Module	230/9.1	38.8/1.5	194.5/7.7	1.5/3.3
19" Rack Mount modules (SLTM32, DTIM24, WTIM24)	53/2.1	436.6/17.2	318/12.5	4.32/9.5 4.02/8.9
Main Cabinet, Enhanced (MCKTE)	265.6/10.5	440/17.3	318.2/12.5	7.78/17.2
• w/PSU module				9.32/20.3
1U RMB	38.3/1.5	482.6/19	183.27.2	2/4.4
DHLD [*1]	146/5.7	111.5/4.4[*1]	128/5	0.4/0.9
WHLD	280/11.0	60/2.4	188.3/7.4	0.2/0.4

NOTE

*1: The width of the Desk Holder bookend mount does not include approximately 40mm (3.2 inches) for each installed module.

2.4.3   Environment specification

Table 2.4.3-1 Environmental Specifications

ITEM	TEMPERATURE	
Operation Temperature	0~40 ^{0}C	32~104 ^{0}F
Optimum Operation Temperature	20~26 ^{0}C	68~78 ^{0}F
Storage Temperature	-20~60 ^{0}C	-4~140 ^{0}F
Relative Humidity	0~80% non-condensing	

2.4.4   Electrical specification

2.4.4.1   System Electrical specification

Table 2.4.4.1-1 System Electrical Specifications

ITEM	SPECIFICATIONS
Module AC/DC Adapter • AC Voltage Input • AC Current Input • DC Output	100-240 VAC, +/-10% @ 50/60 Hz 1.0 amps 48 VDC at 0.8 amps
Keyset AC/DC Adapter • AC Voltage Input • AC Current Input • DC Output	100-240 VAC, +/-10% @ 50/60 Hz 0.2 amps 48 VDC at 0.3 amps
PSU • AC Voltage Input • Fuse • DC Output	100-240 VAC, +/-10% @ 50/60 Hz T6.3, AC250V 48VDC, 5.3 amps 5VDC at 1 amps
SLTM32 PSU • AC Voltage Input • Fuse • DC Output	187~265 VAC @ 47~63 Hz T1, AC250V 30VDC at 1.2 amps 5VDC at 2.5 amps 5VDC at 0.1 amps
External Relay Contact	2 amp @ 30 VDC
Music Source Input	0 dBm @ 600 ohm
External Paging Port	0 dBm @ 600 ohm
LAN Power Feed	0.3 amps max

2.4.4.2   Module & Phone Power Requirements

Table 2.4.4.2-1 Module Power Requirements

No.	Module	Voltage (Vdc)	Max. Current (mA)	Max. Power (Watts)	Remark
1	UCP100/ 600/ 2400	48.0	150	7.2	
2	UVM	48.0	100	4.8	
3	ES8G/ES8GP	48.0	100	4.8	
4	SLTM4	48.0	280	13.4	
5	SLTM8	48.0	440	21.1	
6	DTIM8	48.0	640	30.7	
7	LGCM4/8	48.0	100	4.8	
8	BRIM2/4	48.0	100	4.8	
9	PRIM	48.0	100	4.8	

Table 2.4.4.2-1 Module Power Requirements

No.	Module	Voltage (Vdc)	Max. Current (mA)	Max. Power (Watts)	Remark
10	VOIM8/24	48.0	100	4.8	
11	VMIM	48.0	100	4.8	
12	MCIM	48.0	100	4.8	
13	WTIM4	48.0	432	20.7	
14	WTIM8	48.0	730	35	
15	VCIM	48.0	100	4.8	

Table 2.4.4.2-2 PSU Power Requirements

No.	Module	Voltage (Vdc)	Max. Current (mA)	Max. Power (Watts)	Remark
1	PSU	48.0	5300	254.4	Total(W): 259.4
		5.0	1000	5.0	

Table 2.4.4.2-3 DTIM24/SLTM32/WTIM24 Power Requirements

No.	Module	Voltage (Vdc)	Max. Current (mA)	Max. Power (Watts)	Remark
1	DTIM24	30.0	1850	55.5	Total(W): 58.5
		5.0	600	3	
2	SLTM32	36.0	920	33.1	Total(W): 51.6
		5.0	3500	17.5	
		5.0	200	1.0	
3	WTIM24	36.0	1200	43.2	Total(W): 47.4
		5.0	840	4.2	

NOTE

1) Table 2.4.4.2-1 above provides the maximum power required by each module exception of the ES8GP. The ES8GP power values shown are for the switch itself, and do not include the current draw of any connected devices. The Table may be used to assure the PSU can supply power to the modules in a cabinet.

2) To determine the power needs of a cabinet, add the maximum current for each module including the current for any Powered Device attached to an ES8GP switch. Use Table 2.4.4.2- below to determine the current requirements of LIP Phones attached to the ES8GP. The resulting current must be less than the PSU capability, 5.3 amps.

3) When using an ES8GP, assure the power needs of the ES8GP and all connected Powered Devices does not exceed the rating of the power source. The AC/DC adaptor is providing 0.8 Amps. When the ES8GP is powered by a PSU, use Note 2 above to assure the PSU ratings are not exceeded. The maximum current and classification signature of each LIP-8000E series phones are shown in the following Table 2.4.4.2-. The maximum current for the older LIP 8000 series phones are provided in the lower Table 2.4.4.2- for sites that may have been previously installed.

Table 2.4.4.2-4 LIP-8000E Phone Power Requirements

Model	Current (mA)	IEEE 802.3af Class	Remark
LIP-9070	250	3	
LIP-8050E	125	3	
LIP-8040E	89	2	
LIP-8024E	87	2	
LIP-8012E	84	2	
LIP-8008E	40	2	
LIP-8002E	39	1	
LIP-8050E with 1 LSS	134	3	
LIP-8050E with 2 LSS	143	3	
LIP-8040E with 1 LSS	98	2	
LIP-8040E with 2 LSS	107	2	
LIP-8024E with 1 LSS	96	2	
LIP-8024E with 2 LSS	105	2	
LIP-8012E with 1 LSS	93	2	
LIP-8012E with 2 LSS	102	2	

Table 2.4.4.2-5 LIP-8000 Phone Power Requirements

Model	Current (mA)	IEEE 802.3af Class	Remark
LIP-8050	127	3	
LIP-8040	105	2	
LIP-8024	103	2	
LIP-8012	96	2	
LIP-8008	90	2	
LIP-8002	91	1	
LIP-8050 with 1 LSS	136	3	
LIP-8050 with 2 LSS	145	3	
LIP-8040 with 1 LSS	114	2	
LIP-8040 with 2 LSS	123	2	
LIP-8024 with 1 LSS	112	2	
LIP-8024 with 2 LSS	121	2	
LIP-8012 with 1 LSS	105	2	
LIP-8012 with 2 LSS	114	2	

NOTE

LIP-8012DSS and LIP-8012LSS Serial Consoles are powered from LIP-8050E, LIP-8040E, LIP-8024E, or LIP-8012E Phones. The chart shows the power consumption when an LIP-8012LSS is attached. These power consumption values should also be used when connecting an LIP-8012DSS.

Table 2.4.4.2-6 LIP-9000 Phone Power Requirements

Model	Current (mA)	IEEE 802.3af Class	Remark
LIP-9040	98	2	
LIP-9030	98	2	
LIP-9020	96	2	
LIP-9010	84	1	
LIP-9002	39	1	
LIP-9040 with 9024ButtonKit	112	2	
LIP-9030 with 9024ButtonKit	112	2	
LIP-9020 with 9024ButtonKit	106	2	

2.4.5   Maximum Station Wiring

Table 2.4.5-1 Maximum Station Wiring Distance

ITEM	DISTANCE (M/KFt)	
	22 AWG	24 AWG
LIP Phone to switch port	100/0.328	100/0.328
SIP or H.323 VoIP phone	100/0.328	100/0.328
Digital Terminal to DTIM	500/1.64	300/1
Single Line Telephone to SLTM	6,000/20	4,000/13

2.4.6   Analog CO Loop specification

Table 2.4.6-1 CO Loop Specifications

ITEM	SPECIFICATION
Ring Detect Sensitivity	40 Vrms @ 16~30 Hz
	30 Vrms @ 30~37 Hz
DTMF Dialing • Frequency Deviation • Signal Rise Time • Tone Duration, ON time • Inter-digit Time	Less than +/-1.8% Max. 5ms Min. 50ms Min. 30ms
Pulse Dialing • Pulse Rate • Break/Make Ratio	10 pps 60/40% or 67/33%

NOTE

Ring sensitivity on analog CO Lines will vary from one regulatory region to another.

3   iPECS UCP Hardware Description

3.1   iPECS Modules

3.1.1   UCP Server Module (UCP100/600/2400)

The Unified Communications Platform server modules (UCP100, UCP600 and UCP2400), which are the "call server" for iPECS UCP, extend telephony resources and call processing to the iPECS modules and terminals.

The UCP server modules incorporate miscellaneous interfaces for Music-On-Hold (MOH), Background Music (BGM), contact monitors for Alarm and Doorbell inputs, and external control contacts.

Also, these modules include battery back-up circuitry using a long-life Lithium battery to maintain the real-time clock during power fail.

Each iPECS UCP server module has a 10/100/1000 Base-T Ethernet interface, the "LAN1" RJ-45 connector, which is the interface to the iPECS UCP call server features and functions.

The UCP600 and UCP2400 have a second 10/100/1000 Base-T Ethernet interface "LAN2" RJ-45 connector. The "LAN2" port is employed for redundant processor operation.

For redundant processor operation, the LAN2 ports of the main and back-up UCP are interconnected using a standard RJ-45 cable directly or connect to a LAN port to support remote redundant servers.

The Ethernet ports incorporate auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

The UCP100 and UCP600 server modules include a VSF (Voice Store and Forward) unit for the built-in Auto Attendant, Voice Mail and general System Announcements.

The basic VSF in the UCP100 has eight (8) channels and four (4) hours of audio storage. The UCP600 VSF has eight (8) channels and six (6) hours of storage. Both can be increased by license installation, the UCP100 can be expanded to 14 hours of storage, and the UCP600 can be expanded to support 16 hours of storage. Note the VSF will only support the g.711 Codec.

The UCP100 and UCP600 server modules also include VoIP Switch and DSP, and Multi-party Conference (MCIU) channels as shown in the capacity Table 2.4.1-1.

The VoIP Switch channels act as an agent for iPECS devices handling signaling and media packets, and convert multi-cast packets to unicast for remote and non-iPECS devices.

The VoIP DSP channels are employed for transcoding between major codecs (g.711, g.722, g.729a, and g.723.1).

The MCIU channels mix audio from several different sources for conferencing, supporting multi-party Conference, Conference Room and Conference Group features of the iPECS UCP. The MCIU has six (6) channels to support conferences up to six (6) parties.

VoIP DSP channels can be allocated to expand the MCIU channels available as shown in Table 2.4.1-1 to a maximum of 18 channels supporting conferences up to 18 parties.

The MCIU will support multiple conferences not exceeding the available channels (parties). For additional conference capabilities, MCIMs may be added to the system.

In addition, the UCP100 server module incorporates two built-in FXS ports. An outside Line option unit with four (4) analog CO Lines, two (2) BRI Lines, or four (4) BRI Lines may be installed.

The BRI lines support the ETSI standards for ISDN. Note the option unit will reduce the number of available VoIP DSP channels.

The 4-CO Line and 2-BRI Line option unit reduce the available VoIP DSP channels by two and the 4-BRI Line option unit reduces the VoIP channels by four.

The UCP100 automatically connects the first CO Line to the first SLT port should power to the system fail.

The UCP 600 and 2400 include four (4) Power Fail Transfer circuits that can be wired to desired CO Lines and SLT ports for connection should system power fail.

As shown the below Figure, the UCP100 front panel includes:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- RCA jack for one music (audio) source -BGM1-
- One (1) "LAN1" RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Ten (10) blue LEDs display the operating status
- Reset Switch
- One (1) USB 3.0 host, SIO/USB Memory port,
- Four (4)-position DIP-switch for mode selections
- One (1) DB-9 RS-232 connector

On the rear panel, each UCP100 has:

- Eight (8) RJ-45 female connectors for:
  - One (1) Alarm contact input
  - One (1) BGM/MOH external source input
  - One (1) External Page output
  - One (1) Control Relay contact output
  - Four (4) optional analog CO Line ports or 2 or 4 BRI (2B+D) Lines
  - Two (2) FXS, one used as a Power Fail Transfer circuit
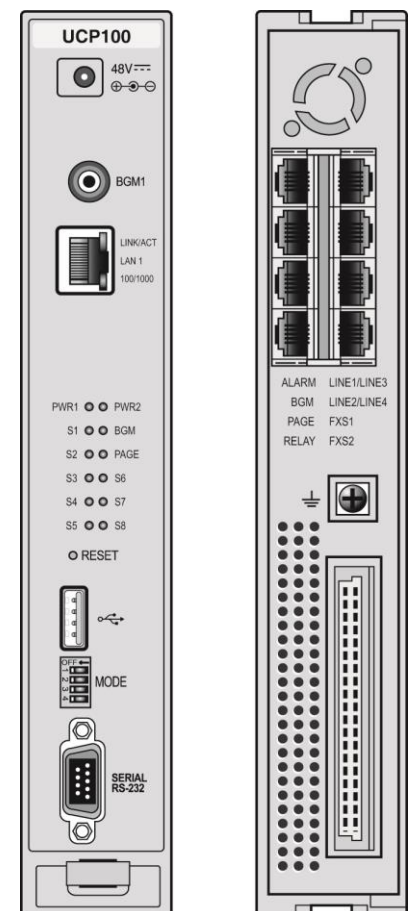- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.1-1 UCP100Front & Rear Panel

The UCP600 and UCP2400 module front panels are shown in Figure 3.1.1-2, and include;

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Master/Slave switch
- RCA jack for one music (audio) source -BGM1-
- Two (2) "LAN1" & "LAN2" RJ-45 Female LAN connectors with Speed and Link/Activity LEDs
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Ten (10) blue LEDs display the operating status
- Reset Switch
- One (1) USB 3.0 host, SIO/USB memory port
- Four (4)-position DIP-switch for mode selections
- One (1) DB-9 RS-232 connector

On the rear panel, each UCP600 and UCP2400 has:

- Eight (8) RJ-45 female connectors for:
  - Alarm
  - BGM and Control Relay inputs
  - External Page outputs
  - Power Fail Transfer circuits
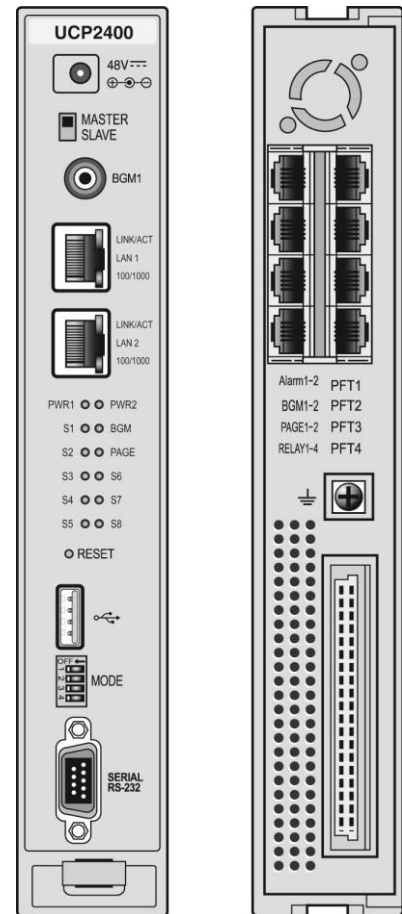- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.1-2 UCP600/2400 Front & Rear Panel

⚠️ **CAUTION**

The USB port of the UCP module is designed for SIO and USB memory; the USB port does not provide power to connected devices.

3.1.2   VOIM8 & 24 (Voice Over IP gateway Modules)

The eight (8) and twenty-four (24) channel Voice over IP gateway Module (VOIM8 and VOIM24) perform protocol translation between standard H.323 or SIP protocol and the iPECS proprietary protocol.

The VOIM8 contains a single processor to support eight (8) VoIP calls.

The VOIM24 contains two (2) processors to support maximum twenty-four (24) VoIP calls. The main processor manages packet switching and signaling for all VoIP calls.

DSPs are employed to support in-band DTMF detection and transcoding between various codec types for each IP channel. The transcoding feature enables users to communicate with each other, when the codec between iPECS and other terminal is different.

Each VOIM8 and VOIM24 includes a 10/100 Base-T Ethernet interface using an RJ-45 type connector. Both Ethernet ports incorporate auto MDI and MDIX switching feature allowing use of either straight cable and cross cable.

As shown the below Figure, the front panels have:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Normal/Service switch
- Two (2) RJ-45 Female LAN connector for master processor with Speed and Link/Act LEDs
- Five (5) status LEDs
- One (1) DB-9 RS-232 connector
- Reset Switch

On the rear panels have:

- Ground Lug
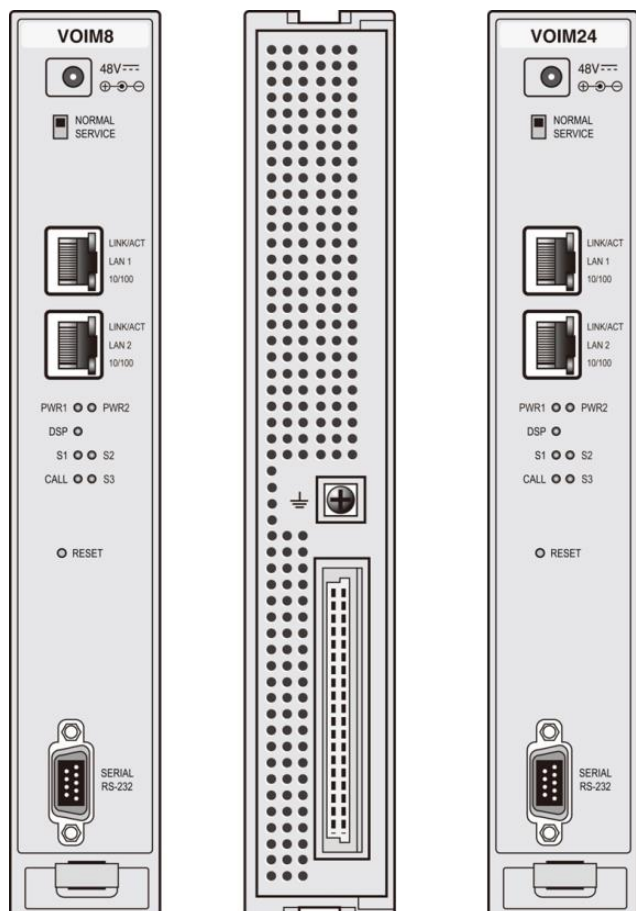- Fifty (50)-pin back plane connector

Figure 3.1.2-1 VOIM8 & 24 Front & Rear Panels

3.1.3   VCIM (VoIP and Conference Interface gateway Module)

The VoIP and Conference Interface gateway Module (VCIM) perform protocol translation between standard H.323 or SIP protocol and the iPECS proprietary protocol or multi-party voice conferences.

The basic VCIM support sixty-four (64) simultaneous DSP channels for VoIP or conference function. The VCIM contains two (2) processors to support maximum one hundred twenty eight (128) DSP channels with software license.

The main processor manages packet switching and signaling for all DSP channels. DSPs are employed to support in-band DTMF detection and transcoding between various codec types for each IP channel.

The transcoding feature enables users to communicate with each other, when the codec between iPECS and other terminal is different.

The VCIM has two Ethernet interface using an RJ-45 type connector. The first Ethernet port support a 10/100/1000 Base-T interface port and incorporate auto MDI and MDIX switching feature allowing use of either straight cable and cross cable. The second Ethernet port supports a 1000 Base-T only.

As shown in

Figure 3.1.3-1, the front panels of the VCIM have:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Normal/Service switch
- Two (2) RJ-45 Female LAN connector for master processor with Speed and Link/Act LEDs
- Two (2) Power status LED
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Six (6) Status LEDs
- One (1) DB-9 RS-232 connector
- Reset Switch

On the rear panel, the VCIM have:

- Ground Lug
- Fifty (50)-pin back plane connector

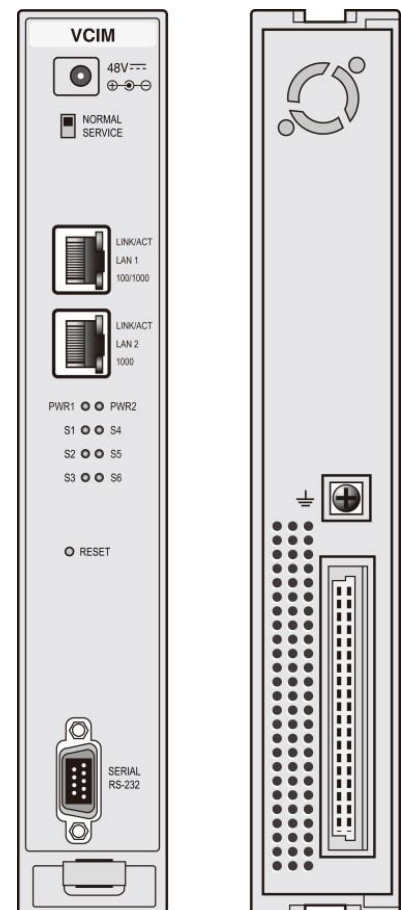**Figure 3.1.3-1 VCIM Front & Rear Panels**

3.1.4   LGCMs (Loop Start CO gateway Module)

3.1.4.1   LGCM4

The Loop Start CO gateway Module (LGCM4) provides four (4) CO/PBX Loop Start Line interfaces. These interfaces support pulse or DTMF dial signals. Each Interface contains ring and loop current detection circuits, speech codec and compression functions, and loop signaling circuits.

The circuitry and software support tone detection. An optional Call Metering Unit (CMU) may be factory or field equipped to support the call metering function. Each CMU supports four (4) ports and is available in three versions for different regions as shown below.

- CMU1216 (12kHz mode, Polarity Reversal) – Australia, Denmark, Italy, Spain, Sweden
- CMU1216 (16kHz mode, Polarity Reversal) – Belgium, India, Israel, Norway, South Africa
- CMU50PR (50Hz, Polarity Reversal – Australia, India, South Africa, South Korea, United Kingdom

The LGCM4 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.4.1-1, the front panel of the LGCM4 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- One (1) LED to indicate if a CMU is installed
- Four (4) LEDs, one for status of each CO line
- Reset Switch
- One (1) DB-9 RS-232 connector

On the rear panel, the LGCM4 has:

- Four (4) RJ-45 female connectors
- Ground Lug
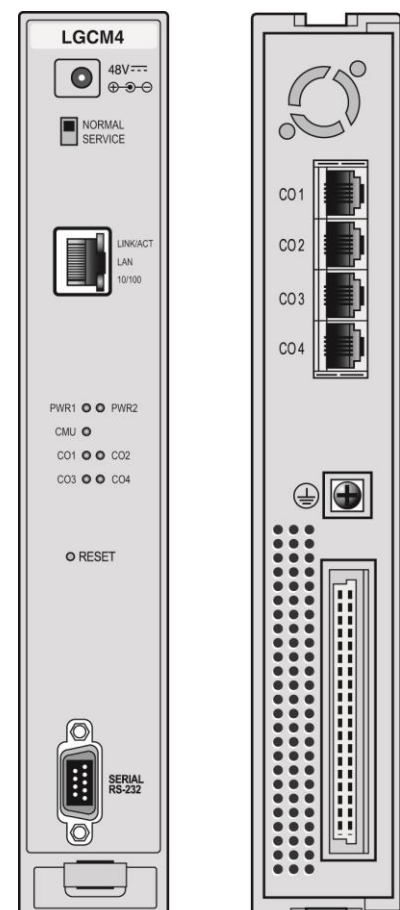- Fifty (50)-pin back plane connector

Figure 3.1.4.1-1 LGCM4 Front & Rear Panels

3.1.4.2   LGCM8

The Loop Start CO gateway Module (LGCM8) provides eight (8) CO/PBX Loop Start Line interfaces. These interfaces support pulse or DTMF dial signals.

Each Interface contains ring and loop current detection circuits, speech codec and compression functions, and loop signaling circuits.

The circuitry and software support tone detection. Optional Call Metering Units (CMUs) may be factory or field equipped to support the call metering function. Each CMU supports four (4) ports and is available in three versions for different regions as shown below.

- CMU1216 (12kHz mode, Polarity Reversal) – Australia, Denmark, Italy, Spain, Sweden
- CMU1216 (16kHz mode, Polarity Reversal) – Belgium, India, Israel, Norway, South Africa
- CMU50PR (50Hz, Polarity Reversal – Australia, India, South Africa, South Korea, United Kingdom

The LGCM8 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.4.2-1, the front panel of the LGCM8 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Two (2) green power status LED
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Two (2) LEDs, one to indicate installation of each CMU
- Eight (8) LEDs, one for status of each CO line
- Reset Switch
- DB-9 RS-232 connector

On the rear panel, the LGCM8 has:

- Eight (8) RJ-45 female connectors
- Ground Lug
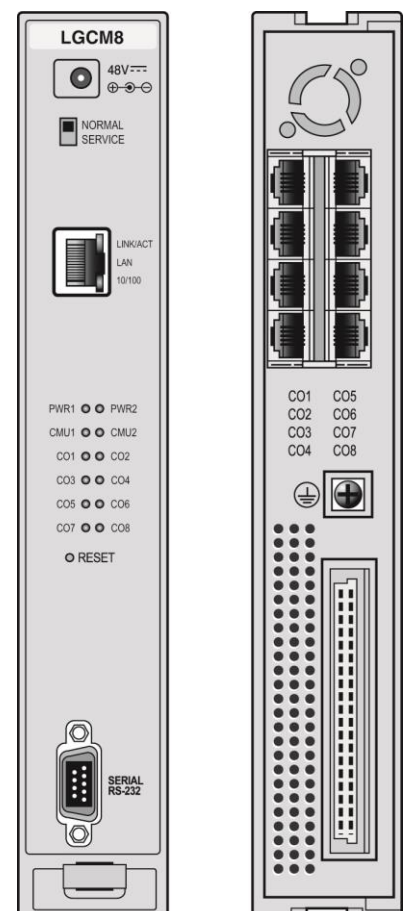- Fifty (50)-pin back plane connector

Figure 3.1.4.2-1 LGCM8 Front & Rear Panels

3.1.5   BRIMs (BRI gateway Module)

3.1.5.1   BRIM2

The Basic Rate Interface gateway Module (BRIM2) has two (2) ISDN Basic Rate Interface ports (2B+D).

This Module supports the "T" interface as described by ETSI 300.012 based on the ITU-T Recommendations I.430, and can be installed in the TE (Terminal Equipment) mode.

The BRIM2 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions.

The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.5.1-1, the front panel of the BRIM2 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- Four (4) status LEDs -two (2) for each BRI Line
- DB-9 RS-232 connector
- Reset Switch

On the rear panel, the BRIM2 has:

- Two (2) RJ-45 female connectors, one for each BRI Line
- Ground Lug
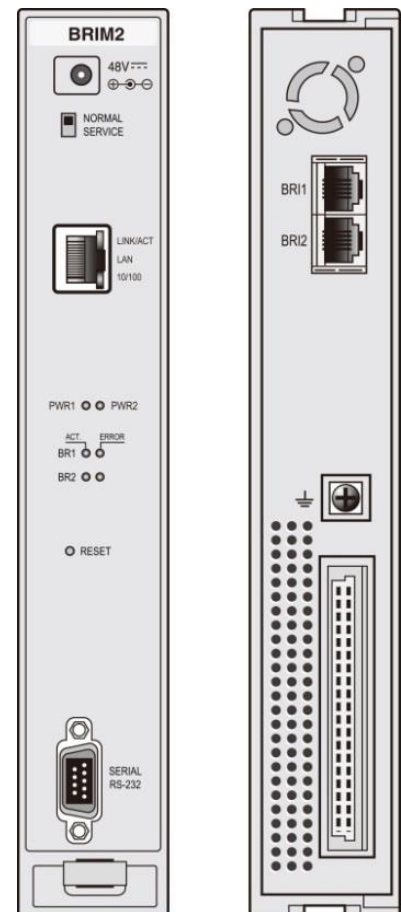- Fifty (50) pin-back plane connector

Figure 3.1.5.1-1 BRIM2 Front & Rear Panels

3.1.5.2   BRIM4

The Basic Rate Interface gateway Module (BRIM4) has four (4) ISDN Basic Rate Interface ports (2B+D).

The BRIM4 supports the "T" interface as described by ETSI 300.012 based on the ITU-T Recommendations I.430, and can be installed in the TE (Terminal Equipment) mode.

The BRIM4 includes DSP circuitry for transcoding between various audio codecs.

The BRIM4 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions.

The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.5.2-1, the front panel of the BRIM4 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- One (1) RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Eight (8) LEDs, two (2) for each BRI Line
- DB-9 RS-232 connector
- Reset Switch

On the rear panel, the BRIM4 has:

- Four (4) RJ-45 female connectors, one for each BRI Line
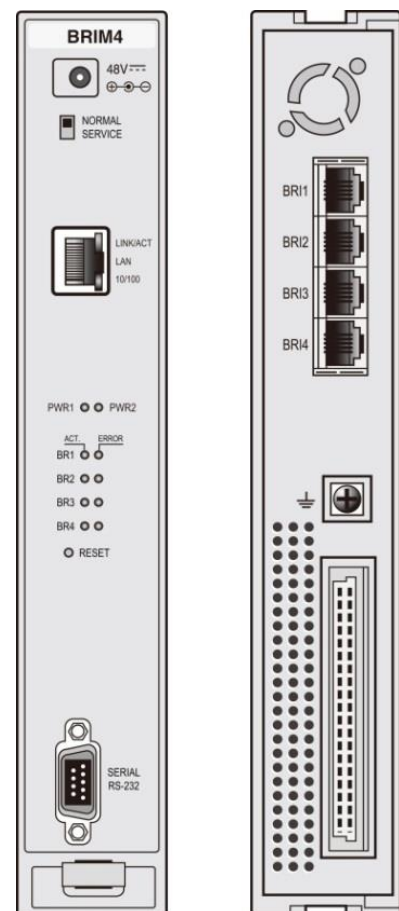- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.5.2-1 BRIM4 Front & Rear Panels

3.1.6   PRIM (PRI gateway Module)

The PRIM module provides one (1) PRI interface.

Modules are available to support either the ETSI standard 30 PCM bearer and 2-signaling channels, or the NA standard 23 PCM bearer and 1 signaling channel format for ISDN Primary Rate Interfaces.

The PRIM includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions.

The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.6-1, the front panel of the PRIM has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Normal/Service switch – In Service mode, circuits in use are busy as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Four (4) LEDs
- DB-9 RS-232 connector
- Reset Switch

On the rear panel, the PRIM has:

- One (1) RJ-45 female connector
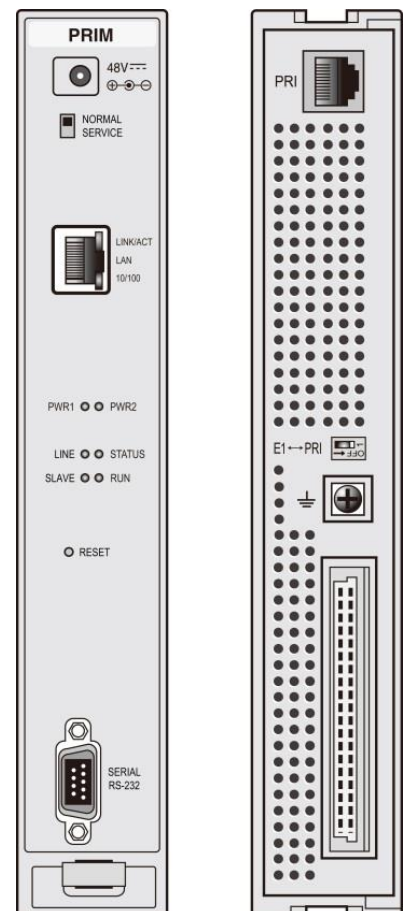- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.6-1 PRIM Front & Rear Panels

3.1.7   DTIMs (Digital Terminal Interface gateway Module)

3.1.7.1   DTIM8

The DTIM8 (Digital Terminal Interface gateway Module) supports eight (8) digital keysets (LKD and LDP models). The multi-button Keysets have access to all the resources of the iPECS as well as keyset functionality and simple one-button feature access. The DTIM8 contains a processor for IP to TDM and signaling conversion as well as DSP circuitry to provide transcoding for each channel.

Digital keysets can be connected up to 300 meters from the DTIM8 gateway using 24 AWG twisted pair cabling.

The DTIM8 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.7.1-1, the front panel of the DTIM8 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 3.3 VDC
  - PWR2 - + 30 VDC
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Eight (8) DKTU status LEDs, one for status of each DTIM channel
- DB-9 RS-232 connector
- Reset Switch

On the rear panel, the DTIM8 has:

- Eight (8) RJ-45 female connectors
- Ground Lug
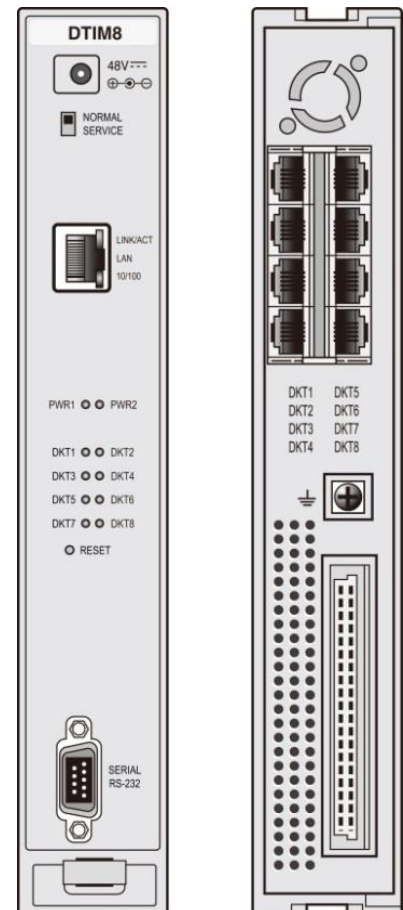- Fifty (50)-pin back plane connector

Figure 3.1.7.1-1 DTIM8 Front & Rear Panels

3.1.7.2   DTIM24

The DTIM24 (Digital Terminal Interface gateway Module) supports 24 digital keysets (LKD and LDP models). Keysets have access to all the resources of the iPECS as well as keyset functionality and simple one-button feature access. The DTIM24 contains a processor for IP to TDM and signaling conversion as well as DSP circuitry to provide transcoding for each channel.

Digital keysets can be connected up to 300 meters from the DTIM24 gateway using 24 AWG twisted pair cabling.

The DTIM24 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.7.2-1 below, the front panel of the DTIM24 has:

- Twelve (12) LEDs, one for status of each DKT
- Run & Power status LED
  - PWR1 - + 5 VDC
  - PWR2 - + 30 VDC
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- DB-9 RS-232 connector
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- Reset Switch

On the rear panel, the DTIM24 has:

- AC input connector
- Ground Lug
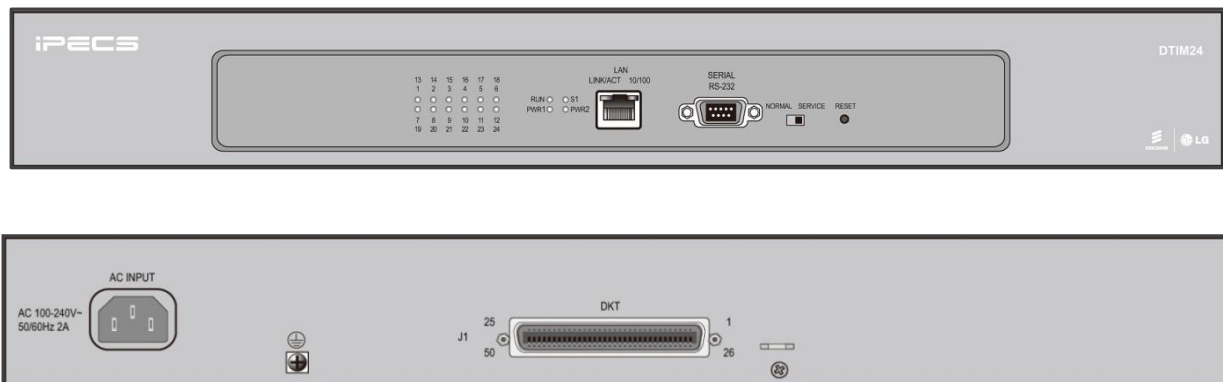- One (1) 25-pair RJ-21x connector

Figure 3.1.7.2-1 DTIM24 Front & Rear Panels

3.1.8 SLTMs (Single Line Telephone gateway Module)

3.1.8.1 SLTM4

The SLTM4 (Single Line Telephone Module) allows standard analog Single Line Telephone (SLT) devices access to CO Lines, other stations, and most features of the system using "dial codes". The SLTM4 provides interface circuitry for four (4) SLTs. Each interface is equipped with appropriate speech codec and compression functions, -40 volt DC feed circuit, pulse and DTMF dial signal detection. A ring generator and message wait source are integrated in the SLTM4. The SLTM4 supports T.38 protocol for Fax over IP.

The SLTM4 allows Single Line Telephones to be connected up to 4 Kilometers (13,000 feet) from the gateway using 24 AWG wire.

The SLTM4 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.8.1-1, the front panel of the SLTM4 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Two (2) green power status LED
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Four (4) SLT LEDs, one for status of each SLT
- Reset Switch
- DB-9 RS-232 connector,

On the rear panel, the SLTM4 has:

- Four (4) RJ-45 female connector
- Ground Lug
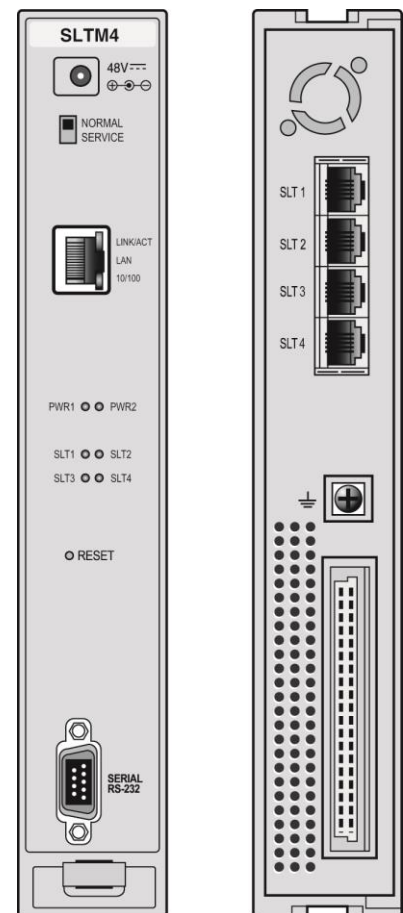- Fifty (50)-pin back plane connector

Figure 3.1.8.1-1 SLTM4 Front & Rear Panels

3.1.8.2   SLTM8

The SLTM8 (Single Line Telephone Module) allows standard analog Single Line Telephone (SLT) devices access to CO Lines, other stations, and most features of the system through the use of "dial codes". The SLTM8 provides interface circuitry for eight (8) SLTs. Each interface is equipped with appropriate speech codec and compression functions, -40 volt DC feed circuit, pulse and DTMF dial signal detection. A ring generator and message wait source are integrated in the SLTM8. The SLTM8 supports T.38 protocol for Fax over IP.

The SLTM8 allows Single Line Telephones to be connected up to 4 Kilometers (13,000 feet) from the gateway using 24 AWG wire.

The SLTM8 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.8.2-1, the front panel of the SLTM8 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Two (2) green power status LED
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Eight (8) SLT LEDs, one for status of each SLT
- Reset Switch
- DB-9 RS-232 connector

On the rear panel, the SLTM8 has:

- Eight (8) RJ-45 female connectors
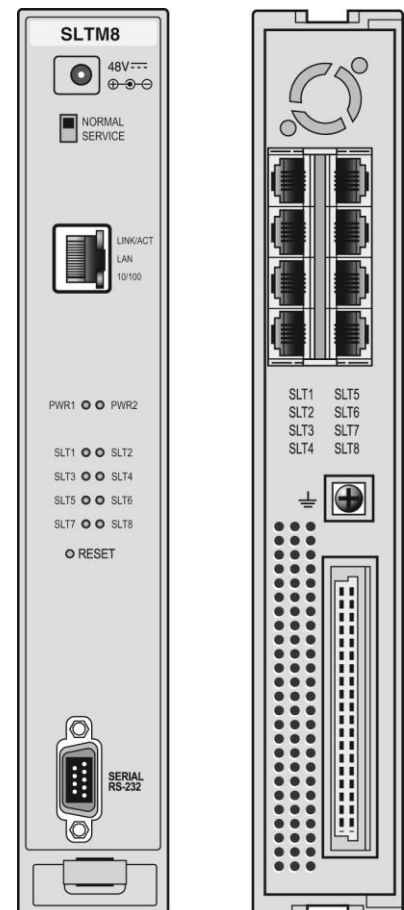- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.8.2-1 SLTM8 Front & Rear Panels

3.1.8.3   SLTM32

The SLTM32 (Single Line Telephone Module) allows standard analog Single Line Telephone (SLT) devices access to CO Lines, other stations, and most features of the system through the use of "dial codes". The SLTM32 provides interface circuitry for thirty-two (32) SLTs. Each interface supports appropriate speech codec and compression functions, -48 volt DC feed circuit; pulse and DTMF dial signal detection. A ring generator and message wait circuitry are integrated in the SLTM32. The SLTM32 supports T.38 protocol for Fax over IP.

The SLTM32 allows Single Line Telephones to be connected up to 4 Kilometers (13,000 feet) from the gateway using 24 AWG wire.

The SLTM32 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.8.3-1, the front panel of the SLTM32 has:

- Sixteen (16) Dual color LEDs, one for status of two SLT ports (Blue: Port 1 ~ 16, Yellow: Port 17 ~ 32)
- Two (2) green power status LED
  - PWR1 - + 5 VDC
  - PWR1 - + 30 VDC
- Two (2) Fan status LED
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- DB-9 RS-232 connector
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- Reset Switch

On the rear panel, the SLTM32 has:

- AC input connector
- Ground Lug
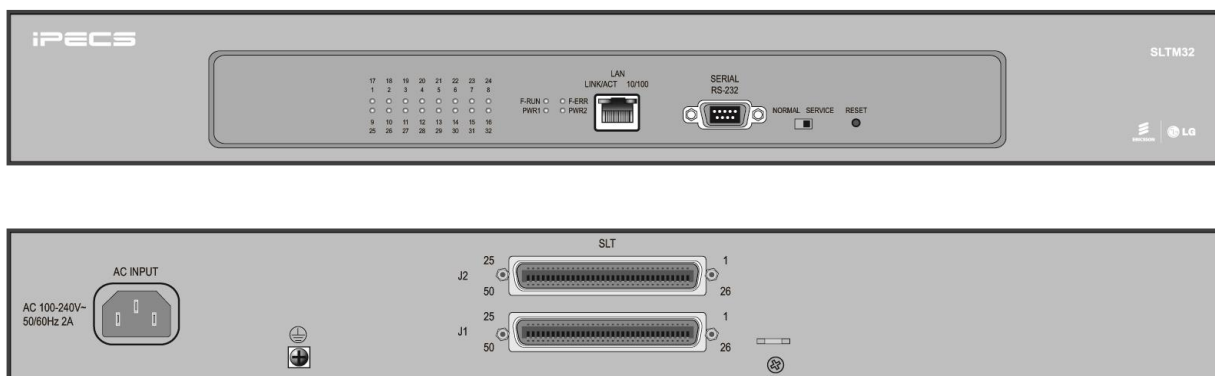- Two (2) 25-pair RJ-21x connectors

Figure 3.1.8.3-1 SLTM32 Front & Rear Panels

3.1.9   UVM (Unified Voice Mail Interface gateway Module)

The UVM (Unified Voice Mail Interface Module) provides mid-range Auto Attendant/Voice Mail services for the iPECS UCP, primarily intended to support the UCP2400 but can be employed with any iPECS UCP server. The UVM contains a processor, DSP and memory circuitry for the Auto Attendant and Voice Mail functions, and various System announcements. The basic UVM supports eight (8) simultaneous channels and 50 hours of voice storage capacity. The iPECS UCP servers can support multiple UVM modules for additional channel and storage capacity as shown in the chart below. Note the UCP100 and UCP600 include additional built-in VSF channels as discussed in 3.1.1.

UCP Server	Maximum UVM	Total UVM Channels	Total UVM Storage (hours)
UCP100	2	32	400
UCP600	6	96	1200
UCP2400	30	480	6000

The UVM has a 10/100/1000 Base-T Ethernet interface and packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching allowing both straight and cross cables.

As shown the below Figure, the front panel of the UVM has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Normal/Service switch – In Service mode, circuits in use are busy as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Two (2) green power status LED
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- Six (6) Status LEDs
- Reset Switch
- One (1) USB 3.0 Host port connector
- Four (4)-position DIP-switch for mode selections
- DB-9 RS-232 connector

On the rear panel, the UVM has:

- Ground Lug
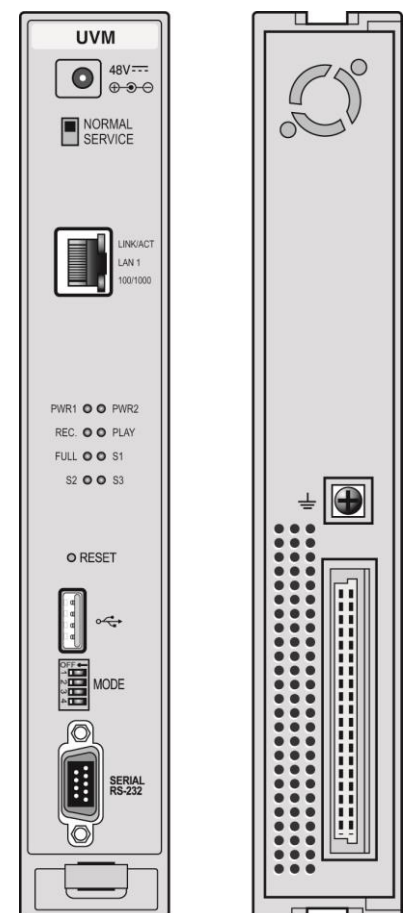- Fifty (50)-pin back plane connector

Figure 3.1.9-1 UVM Front & Rear Panels

3.1.10   MCIM (Multi-Media Conference Interface gateway Module)

The Multi-Media Conference Interface gateway Module (MCIM) permits users to establish multi-party voice conferences with up to 32 simultaneous parties using the g.711 or g.729 codec and 24 parties with the g.723 codec. The MCIM contains a control processor as well as DSP circuitry to support conferences.

The MCIM includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown the below Figure, the front panel of the MCIM has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC

- Normal/Service switch – In Service mode, circuits in use are busy as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Four (4) status LEDs
- DB-9 RS-232 connector
- Reset Switch

On the rear panel, the MCIM has:

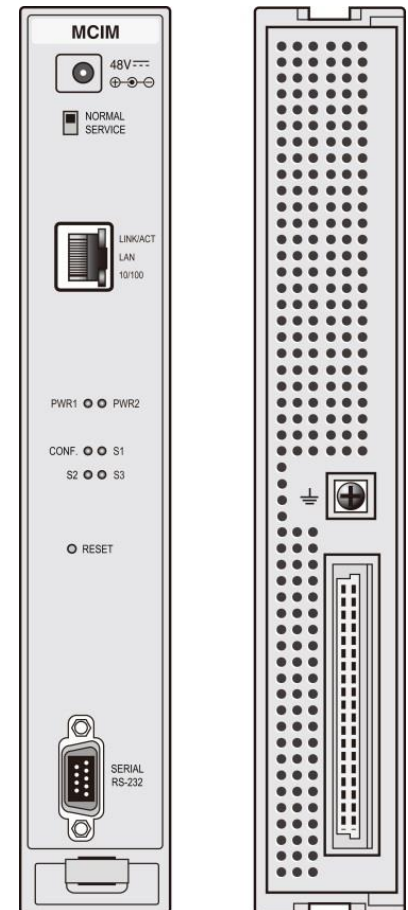- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.10-1 MCIM Front & Rear Panels

3.1.11   ES8GP (Ethernet Switch, 8-Port Gigabit PoE)

The ES8GP is a nine (9) port Ethernet switch, which switches packets between two specified ports. The Power over Ethernet Switching Module (ES8GP) has eight (8) LAN ports and an UPLINK LAN port. All ports support Auto-sense 10/100/1000Mbps, half/full duplex mode and auto MDI/MDIX function, the latter permits use of both straight-through and crossed cables.

The eight (8) LAN ports of the ES8GP are equipped with circuitry to provide power (48 VDC) to LIP Phones through the LAN cable. The ES8GP supplies power automatically to terminals in accordance with the IEEE 802.3af PD (Powered Device) specification. When powered by the Main Cabinet PSU, the ES8GP can support eight (8) Class 3 devices.   When powered by the AC/DC Adapter, the ES8GP supports four (4) Class 2 or two (2) Class 3 devices. LEDs are provided on the front panel to display the power feed status of each port. Note the UPLINK LAN port is not equipped with the power feed circuitry.

In case of connecting the port of ES8GP to another PoE LAN Switch, the port of another PoE LAN Switch must connect to UPLINK LAN Port of ES8GP.

As shown in Figure 3.1.11-1, the front panel of the ES8GP has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LED
   - PWR1 - + 5 VDC
   - PWR2 - + 3.3 VDC
- Eight (8)-port PoE dual color status LEDs
- One (1) RJ-45 Female "UPLINK" LAN connector with Speed and Link/Activity LEDs
- Eight (8) RJ-45 Female LAN connectors with Speed and Link/Activity LEDs, one per port

On the rear panel, the ES8GP has:

- DB-9 RS-232 Serial port connector
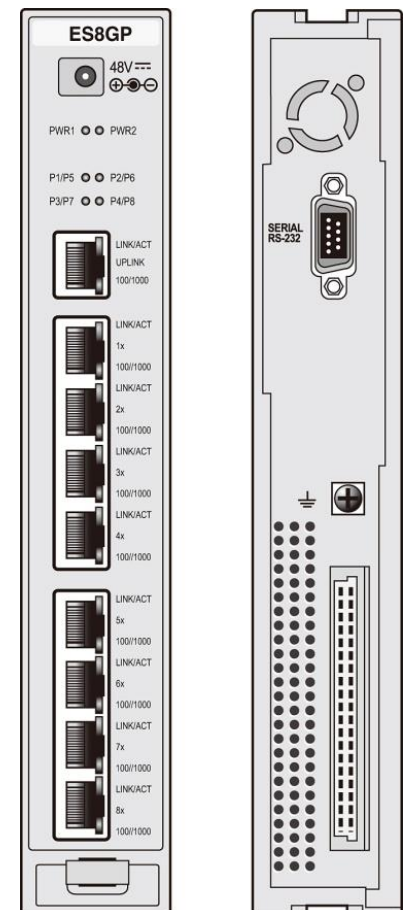- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.11-1 ES8GP Front & Rear Panels

3.1.12   ES8G (Ethernet Switch, 8-Port Gigabit)

The ES8G is a nine (9) port Ethernet switch, which switches packets between two specified ports.

The Switching Module (ES8G) has eight (8) LAN ports and an UPLINK LAN port, all of which employ Ethernet switching. All ports support Auto-sense 10/100/1000Mbps, half/full duplex mode and auto MDI/MDIX function. The later permits the use of both straight-through and crossed cables.

As shown in Figure 3.1.12-1, the front panel of the ES8G has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LED
  - PWR1 - + 5 VDC
  - PWR2 - + 3.3 VDC
- One (1) RJ-45 Female "UPLINK" LAN connector with Speed and Link/Activity LEDs
- Eight (8) RJ-45 Female LAN connectors with Speed and Link/Activity LEDs, one per port

On the rear panel, the ES8G has:

- DB-9 RS-232 Serial port connector
- Ground Lug
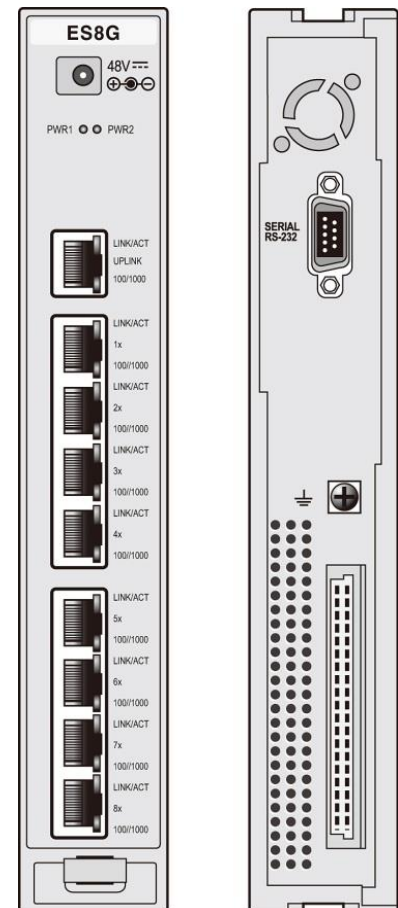- Fifty (50)-pin back plane connector

Figure 3.1.12-1 ES8G Front & Rear Panels

3.1.13   WTIM (Wireless Telephone Interface Module)

3.1.13.1   WTIM4

The WTIM4 (Wireless Terminal Interface gateway Module) provides connections for four (4) Ericsson-LG Enterprise multi-channel DECT Base stations. The DECT Base station acts as the Remote Fixed Part (RFP) defined in the DECT specifications. The GDC-400B, GDC-600B and GDC600BE DECT Base Stations are supported.

DECT handsets can be used if the Base station is connected to a WTIM4 and the proper Attendant programming is completed. The WTIM4 contains a processor for IP to TDM voice and signaling conversion and DSP circuitry to provide transcoding for each channel. The Base station can be connected to the WTIM4 up to 600 meters from the gateway using 24 AWG twisted pair cabling.

The WTIM4 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.13.1-1, the front panel of the WTIM4 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 3.3 VDC
  - PWR2 - + 30 VDC
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Four position Mode switch
- Eight (8) WTIM4 status LEDs
- Two RJ-45 Sync connectors to link WTIMs
- 2-position control switch
- DB-9 RS-232 connector
- Reset Switch

On the rear panel, the WTIM4 has:

- Four (4) RJ-45 female connectors
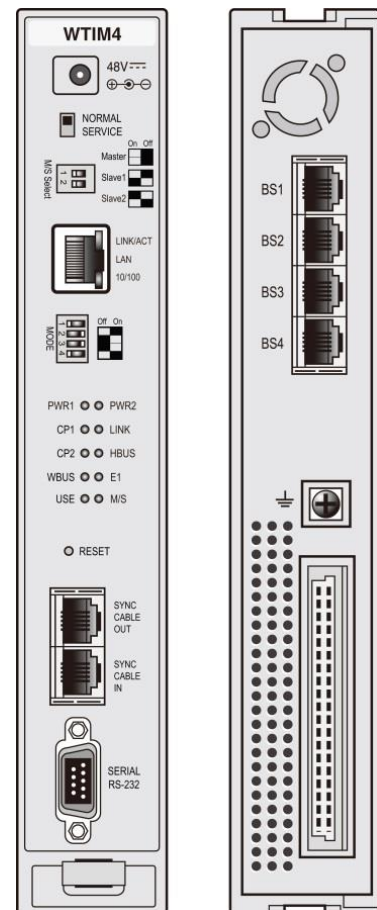- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.13.1-1 WTIM4 Front & Rear Panels

3.1.13.2 WTIM8

The Wireless Terminal Interface gateway Module (WTIM8) provides connections for eight (8) Ericsson-LG Enterprise multi-channel DECT Base stations. The DECT Base station acts as the Remote Fixed Part (RFP) defined in the DECT specifications. The GDC-400B, GDC-600B and GDC600BE DECT Base Stations are supported.

DECT handsets can be used if the Base station is connected to the WTIM8 and the proper Attendant programming is completed. The WTIM8 contains a processor for IP to TDM and signaling conversion and DSP circuitry to provide transcoding for each channel. The Base station can be connected to the WTIM8 up to 600 meters from the gateway using 24 AWG twisted pair cabling.

The WTIM8 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.1.13.2-1, the front panel of the WTIM8 has:

- Power jack for the AC/DC adapter; see 3.1.15 AD/DC adapter –G-
- Two (2) green power status LEDs
  - PWR1 - + 3.3 VDC
  - PWR2 - + 30 VDC
- Normal/Service switch – In Service mode, circuits in use are busied as they return to idle
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- Four position Mode switch
- Eight (8) WTIM8 status LEDs
- Two RJ-45 Sync connectors to link WTIMs
- 2-position control switch
- DB-9 RS-232 connector
- Reset Switch

On the rear panel, the WTIM8 has:

- Eight (8) RJ-45 female connectors
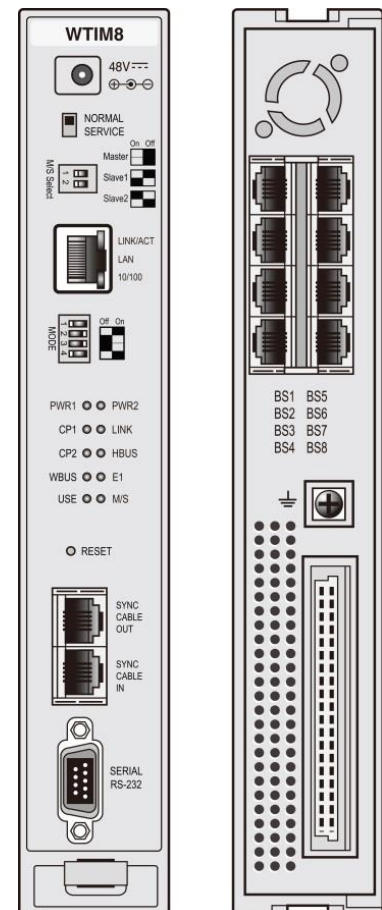- Ground Lug
- Fifty (50)-pin back plane connector

Figure 3.1.13.2-1 WTIM8 Front & Rear Panels

3.1.13.3   WTIM24

The Wireless Terminal Interface gateway Module (WTIM24) provides connections for twenty-four (24) Ericsson-LG Enterprise multi-channel DECT Base stations. The DECT Base station acts as the Remote Fixed Part (RFP) defined in the DECT specifications. The GDC-600BE DECT Base Stations are supported only.

DECT handsets can be used if the Base station is connected to the WTIM24 and the proper Attendant programming is completed. The WTIM24 contains a processor for IP to TDM and signaling conversion and DSP circuitry to provide transcoding for each channel. The Base station can be connected to the WTIM24 up to 600 meters from the gateway using 24 AWG twisted pair cabling. DECT handsets are supported GDC-480H and GDC-500H only.

***Remark**: To use the auto call recording in the DECT Handset connected to the WTIM24, MCIM modules should be installed in the system. But, WTIM8 supports up to 15 channels recording without MCIM modules.

The WTIM24 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in figure 3.1.13.3-1, the front panel of the WTIM24 has:

- Six (6) blue color Link status LEDs and One (1) red color LED for FAN fault
- Twelve (12) dual color (Blue/ Yellow) status LEDs for DECT base connection
- Six (6) blue color status LEDs
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC
  - PWR2 - + 30 VDC
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- DB-9 RS-232 connector
- Four position Mode switch for setting
- Reset Switch

On the rear panel, the WTIM24 has:

- AC input connector and Ground Lug
- Three (3) x Eight (8) ports RJ-45 female connectors for DECT Base stations
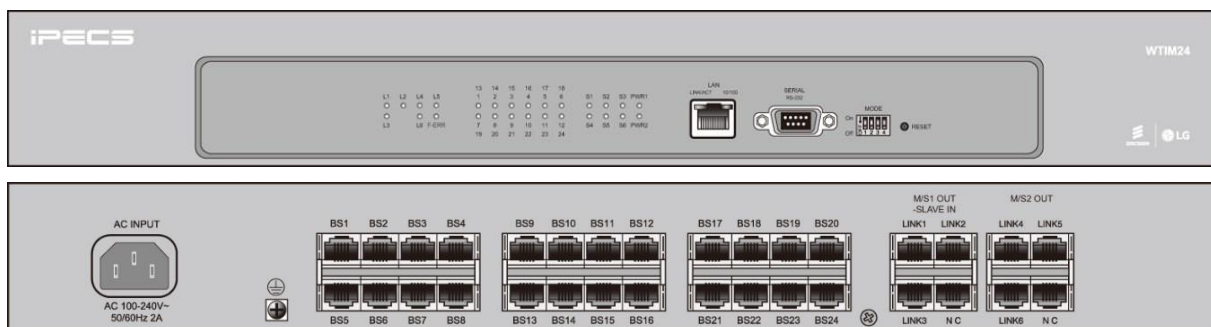 Two (2) x Four (4) ports RJ-45 female connectors to link WTIMs (Master/ Slave System)

Figure 3.1.13.3-1 WTIM24 Front & Rear Panels

3.1.14 PSU (Power Supply Unit)

The Power Supply Unit (PSU) converts 100-240 VAC @ 50/60 Hz to -48V and 5V DC. The DC voltages are connected to the back plane for distribution to modules installed in the Enhanced Main Cabinet. Power is connected via the back plane connector on the PSU and individual modules.

In most configurations, the PSU is capable of supplying 48 VDC power to a full cabinet of nine (9) modules. The current draw for the different modules varies greatly; PSTN, ISDN other modules require about 5 watts each while an ES8GP powering eight (8) phones may require over 50 watts. Designing a PSU to deliver power to nine ES8GP modules would create a cost penalty for most configurations.

A simple rule of thumb is to limit the number of DTIM4, DTIM8, WTIM4, WTIM8 and ES8G/ES8GP modules to five (5) per cabinet. To calculate the precise current draw of any cabinet configuration, use the Power draw chart in Table 2.4.4.2-1.

The total current required must be less than the PSU capacity, 5.3 amps. If more than the PSU capacity, reconfigure the cabinet modules or install some of the modules in a second cabinet with a separate PSU.

The PSU includes a DB9 connector for RS-232 communication with gateway modules for alarm notifications.

As shown in Figure 3.1.14-1, the front panel of the PSU has:

- Six (6) Status LEDs
- Alarm Switch – to activate local audio alarm via the buzzer
- Buzzer for local audio indication of alarm condition
- DB-9 RS-232 connector
- Power Switch
- AC Power Input
- Fuse

On the rear panel, the PSU has:
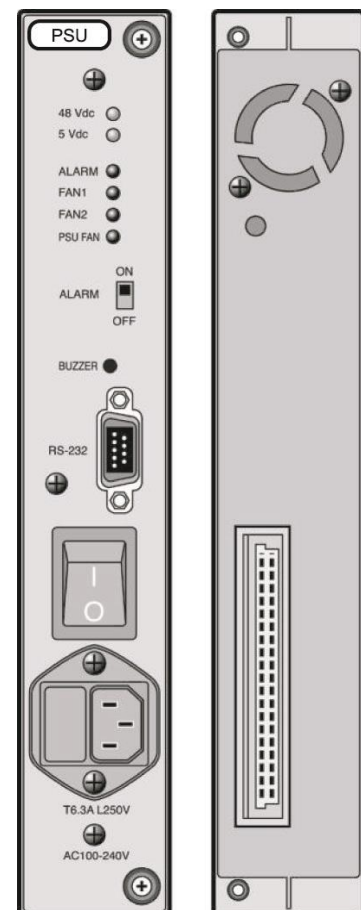
- Thirty-two (32)-pin back plane connector

Figure 3.1.14-1 PSU Front & Rear Panels

3.1.15   AD/DC adapter –G

An optional AC/DC adapter is available to power a module when the PSU is not employed.

The adapter is supplied with a two (2) meter, six (6) foot, AC cord terminated with the nationally relevant AC blade type.

The adapter supports AC input power systems with rated voltage range of 100-240 VAC @ 50/60 Hz.

The adapter provides 48 VDC, 0.8 amps.

The DC output connector is cabled to the adapter with a two (2) meter, six (6) foot, cable.
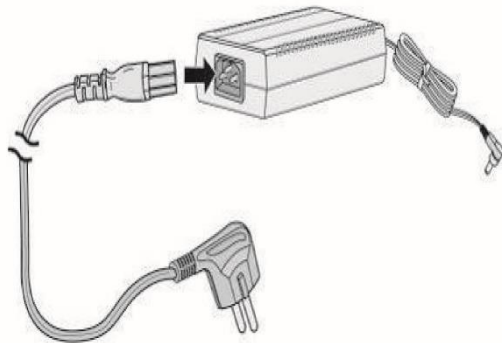

Figure 3.1.15-1 AD/DC adapter –G

3.2   Module Mounting Hardware

Basic iPECS modules can be installed in several different manners:

- Desk mounted using the **Desk Mount Holder**,
- Wall mounted individually using the **Wall Mount Holder**,
- 19" rack mounted individually using the **1U-Rack Mount Bracket**,
- Cabinet installed using the **Enhanced Main Cabinet**, which can be 19" rack, Desk or Wall mounted.

The SLTM32 and DTIM24/WTIM24 are mounted only in a 19" rack and the PSU module may only be installed in the Main Cabinet.

The following paragraphs describe the mounting hardware for the modules and Main Cabinet mounting options.

3.2.1   DHLD (Desk Mount Holder) / DHE (Desk Mount Holder Extender)

The DHLD (Module Desk Mount Holder) consists of a pair of "bookends" and DHE (Desk Mount Holder Extender). One Extender is installed between the bookends for each module, and the modules mounted between the bookends. The DHLD and DHE are shown in Figure 3.2.1-1.
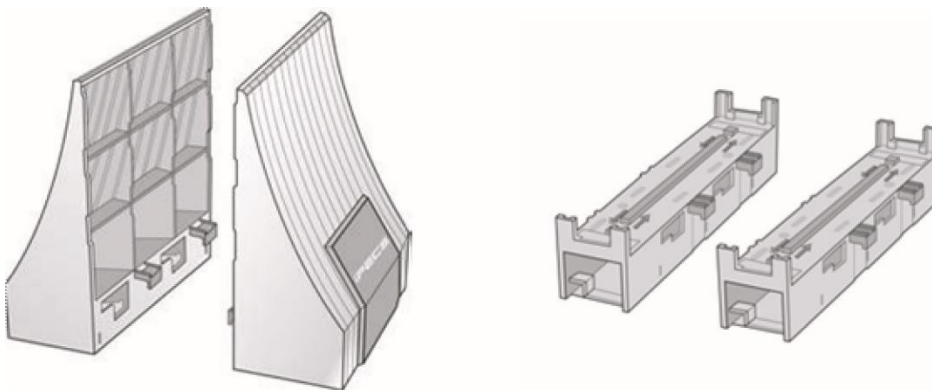

Figure 3.2.1-1 DHLD & DHE

3.2.2   WHLD (Wall Mount Holder)

iPECS modules can be individually wall mounted in the WHLD (Module Wall Mount Holder), shown in Figure 3.2.2-1. The WHLD provides wall mounting for a single module.
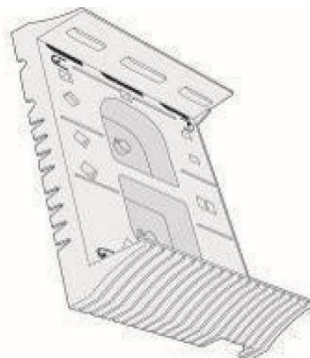

Figure 3.2.2-1 Module Wall Mount Holder

3.2.3   1U-RMB (1U Rack Mount Bracket)

iPECS UCP modules can be individually 19" rack mounted in the 1U-RMB (Rack Mount Bracket), shown in Figure 3.2.3-1. The 1U-RMB provides 19" rack mounting for a single module.
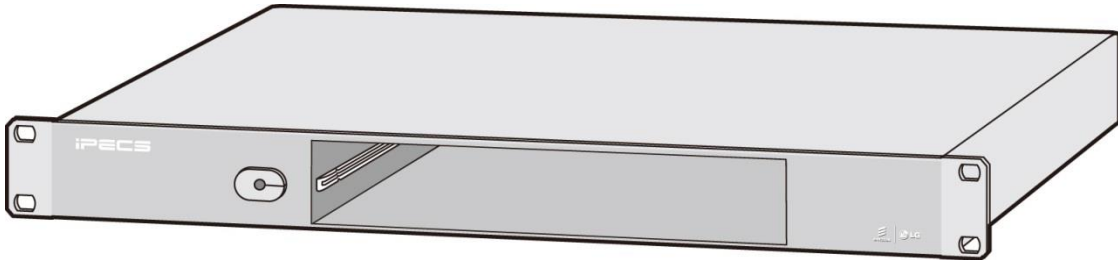

Figure 3.2.3-1 1U RMB

3.2.4   MCKTE (Main Cabinet Kit Enhanced)

The Enhanced Main Cabinet Kit shown in the below Figure has 10 slots for iPECS modules and the PSU.

Slot 10 is only for the PSU; slot 9 is for iPECS modules or a second PSU when redundant power is required.

The remaining slots may be used for any combination of iPECS modules.

On the left side, the front cover of the cabinet has a push button for installing and removing the cover and incorporates a key lock, which can be locked to minimize unauthorized access.
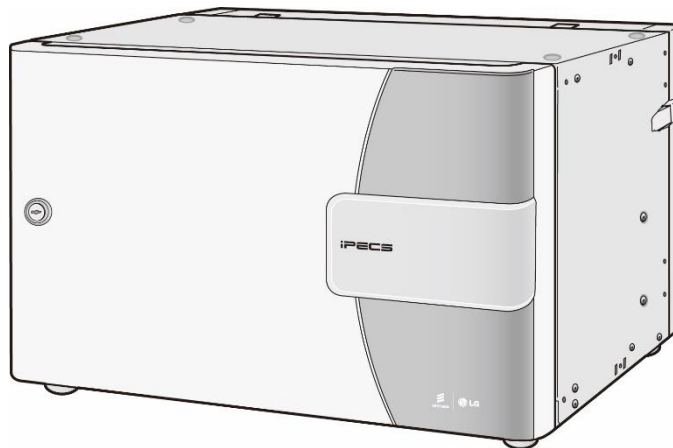

Figure 3.2.4-1 Main Cabinet

Available mounting hardware allows the cabinet to be 19" rack mounted, desk mounted, or wall mounted.

The 19" Rack, Desk and Wall Mount hardware are shown in Figure 3.2.4-2, Figure 3.2.4-3, and Figure 3.2.4-4 below, respectively.

Note that 19" Rack and Desk mount hardware are included with the cabinet, the Wall Mount hardware must be ordered separately.
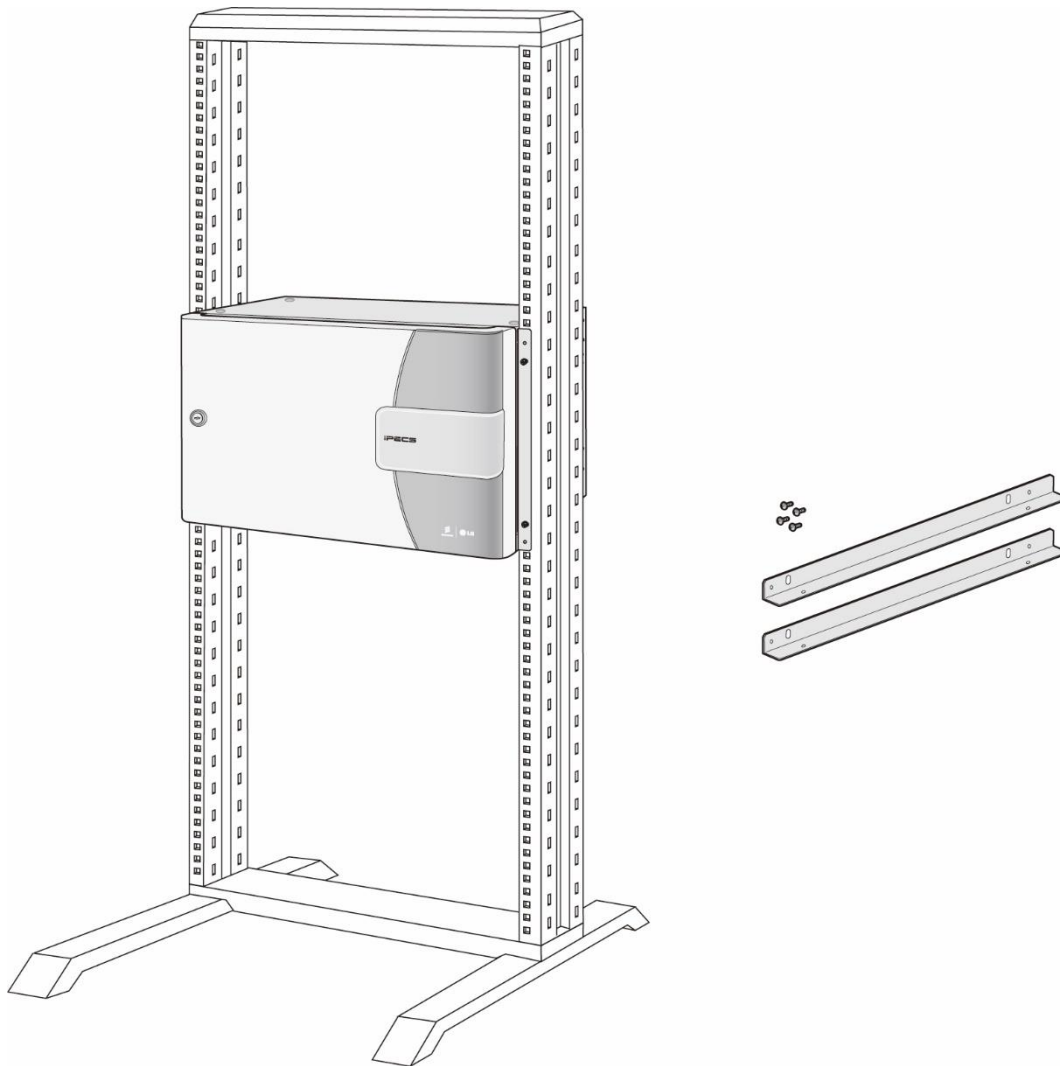
Figure 3.2.4-2 19" Rack Mount Installation

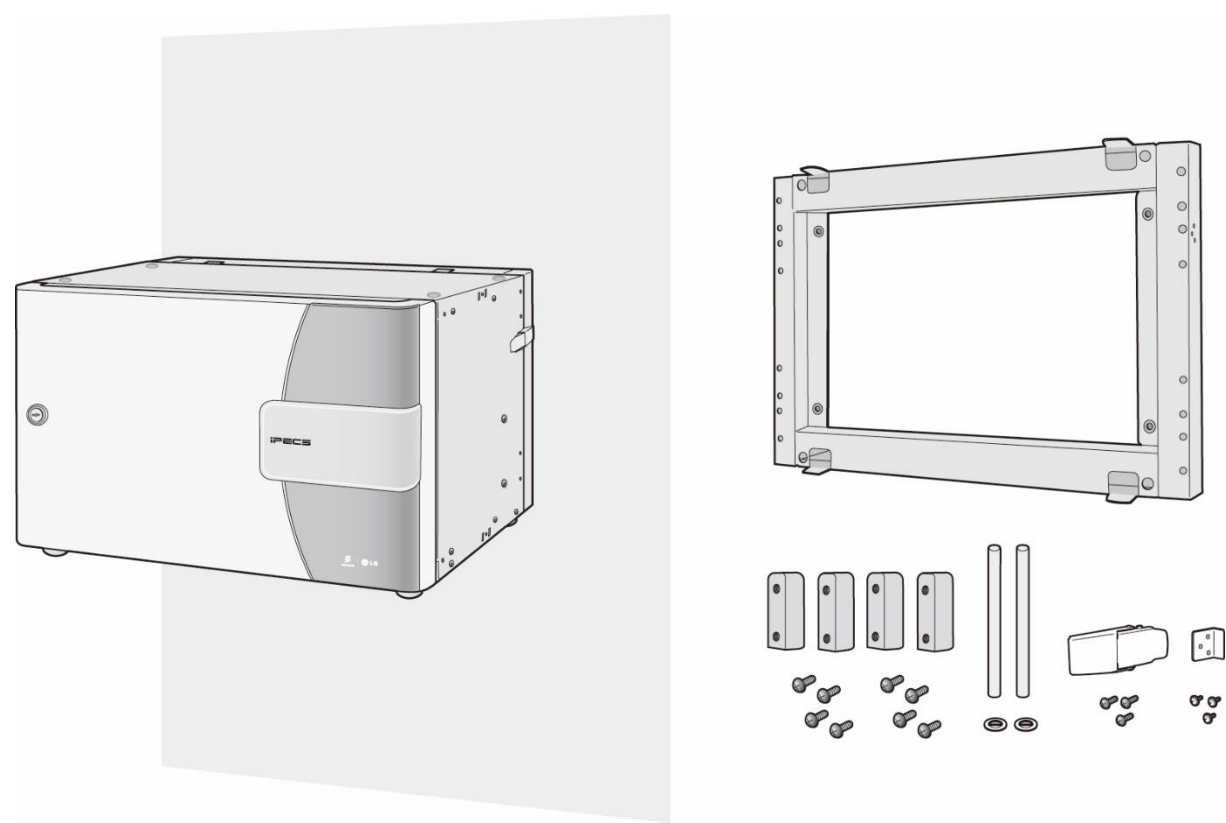**Figure 3.2.4-3 Desk Mount Installation**

Figure 3.2.4-4 Wall Mount Installation

3.3   LIP Phones & Terminals

iPECS UCP is compatible with the latest Ericsson-LG Enterprise LIP phone series (LIP-8000, LIP-8000E, and LIP-9000). Ericsson-LG Enterprise digital phones including the LDP-7000, LDP-9000, LDP-9200 series and older LKD series phones are also compatible with iPECS UCP. In addition, a number of standard telephone types including SLTs and SIP phones can be employed with iPECS UCP.

For more detailed information about Phone installation, DSS connection, and Wall mount, etc. refer to User guide or Quick Guide (Quick Installation Guide) of the terminal model. In this chapter, the brief information is described.

Table 3.3-1 Terminal Models

Model	Description
LDP-7004N	4 Flexible Button No display
LDP-7004D	4 Flexible Button w/Display
LDP-7008D	8 Flexible Button w/Display
LDP-7016D	16 Flexible Button w/Display
LDP-7024D	24 Flexible Button w/Display
LDP-7024LD	24 Flexible Button w/Large Display
LDP-7048DSS	48 Button DSS/DLS Console
LDP-DPB	Door Phone Box
LDP-9008D	8 Flexible Button w/Display
LDP-9030D	30 Flexible Button w/Display
LDP-9048DSS	48 Button DSS Console
LDP-9208D	8 Flexible Button Display
LDP-9224D	24 Flexible Button Display
LDP-9224DF	24 Flexible Button, Full duplex
LDP-9240D	24(12*2 page) Flexible Button, Full duplex
LDP-9248DSS	48 Flexible Button DSS Console
LIP-7000 Series	LIP-7008D, LIP-7016D, LIP-7024D, LIP-7024LD
LIP-8000 Series	LIP-8002, LIP-8004D, LIP-8008D, LIP-8012D, LIP-8024D, LIP-8040L
LIP-8012DSS	12 Button DSS Console / Power supply
LIP-8012LSS	12 Button LSS Console / via keyset up to 2
LIP-8048DSS	48 Button DSS Console / via external up to 4
LIP-8040LSS	48 Button DSS Console w/Display via external or PoE up to 9
LIP-8002E/2AE	4 Feature Button w/Display
LIP-8008E	8 Flexible Button w/Display
LIP-8012E	12 Flexible Button w/Display
LIP-8024E	24 Flexible Button w/Display
LIP-8040E	10 Flexible Button w/Large Display
LIP-8050V	5 Flexible Button, w/Color Display & Video Camera
LIP-8050E	4.3 inches wide color Graphic screen, 5 buttons
LIP-9002	4-flexible buttons w/Display
LIP-9010	3-line 320 by 48 dot graphic LCD and 5 flexible buttons.
LIP-9020	4-line 320 by 80 dot graphic LCD, 10 flexible buttons and 3 soft keys.

Model	Description
LIP-9030	6-line 320 by 112 dot graphic LCD, 8 flexible buttons and 3 soft keys.
LIP-9040	8-line 320 by 144 dot graphic LCD, 12 flexible buttons and 3 soft keys.
LIP-9012DSS	12 flexible buttons with tri-color LED
LIP-9024DSS	24 flexible buttons with tri-color LED
LIP-9024LSS	12 flexible buttons with tri-color LED/ two flexible button pages to represent 24 total flexible buttons
LIP-9048DSS	48 flexible buttons with tri-color LED
LIP-9070	Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol)
LIP-9071	Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol)
WIT-400HE	iPECS WLAN Phone
GDC-450H/480H/500H/800H	Business DECT, Full color LCD
1010i	4-line 132 by 64 dot graphic LCD, 4 flexible buttons and 3 softkeys.
1020i	4-line 132 by 64 dot graphic LCD, 8 flexible buttons and 3 softkeys.
1030i	5-line 320 by 240 dot graphic LCD, 6 flexible buttons and 3 softkeys.
1040i	6-line 480 by 320 dot graphic LCD, 8 flexible buttons and 3 softkeys.
1050i	8-line 480 by 272 dot graphic LCD, 12 flexible buttons and 3 softkeys.
1080i	Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android 10 OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol)
1024idss	24 flexible buttons with tri-color LED, Paper Label
1048ilss	2x24 flexible buttons with tri-color LED, LCD Display
1048idss	48 flexible buttons with tri-color LED, Paper Label

3.4   Software Components

iPECS software comes pre-loaded in the various system modules. In addition, application and services software have been developed to expand and enhance iPECS functionality.

Applications and Services offered include:

- iPECS Attendant - Office
- iPECS Attendant - Hotel
- iPECS UCS Server
- iPECS UCS Clients (Windows desktop and Mobile Android/iOS/Windows)
- iPECS IPCR
- iPECS CCS (Call Center Solution)
- iPECS NMS (Network Management Services)
- IP Networking/Qsig Networking
- Click Call
- Report Plus
- MS Lync (RCC Gateway/Client)
- AMP (ACD Manager Protocol)
- AMSI (need IOT)
- T-Net
- TAPI (1ST Party)
- TAPI (3RD Party)
- Fidelio I/F
- SIP Extension
- iPECS UCP Hotel
- iPECS AIM (Advanced Integration Messaging)

These software packages are documented in other manuals. Contact your local Ericsson-LG Enterprise representative for a list of other documents available for iPECS UCP.

4 Installation overview

4.1   Pre-Installation Guidelines

Prior to installation, please read the following guidelines concerning installation and wiring. Be sure to comply with applicable local regulations.

4.1.1   Safety Installation Instructions

When installing the telephone wiring, basic safety precautions, including those below, should always be followed to reduce the risk of fire, electric shock and personal injury:

- Never install the telephone wiring during a lightning storm.
- Never install the telephone jack in wet locations unless the jack is specifically designed for wet locations.
- Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Anti-static precautions should be taken during installation.

4.1.2   Installation precautions

The iPECS UCP mounting hardware options permit desktop, wall or a freestanding 19" rack mounting. Avoid installing in the following places:

- In direct sunlight and hot, cold, or humid places, Temperature range = 0^oC to 40^oC.
- Places where shocks or vibrations are frequent or strong.
- Dusty places or places where water or oil may come into contact to the hardware or wiring.
- Near strong RF generating devices such as sewing machines or electric welders.
- On or near computers, fax machines, or other office equipment, as well as microwave ovens or air conditioners.
- Do not obstruct the openings in cabinets or modules of the iPECS UCP.

4.1.3   Wiring Precautions

Be sure to follow these precautions when wiring:
- Do not wire the telephone cable in parallel with an AC power source to a computer, fax machine, etc. If the cables are run near such wires, shield the cables with metal tubing or use shielded cables and ground the shields.
- If the cables are run on the floor, use protectors to prevent the wires from being stepped on. Do not place wiring under carpets.
- Avoid using the same power supply outlet for computers, fax machine, and other office equipment to avoid induction of electrical noise into the system resulting in poor audio quality or static.
- The power and battery switches must be OFF during wiring. Further, while wiring, power must not be

connected to the cabinet or modules. After wiring is completed, the power can be connected, and the power switch may be turned ON.

- Incorrect wiring may cause the iPECS UCP System to operate improperly.
- If an extension does not operate properly, disconnect the telephone from the extension line and then re-connect, or turn the System power OFF and then ON again.

4.1.4   Checking Power cord

Checking the power cord at least once a year to prevent fire hazard or electric shock.

Be sure to disconnect the power cord from the wall outlet and System's inlet for the following symptoms:

- Burn marks on the plug.
- The prongs on the plug are deformed.
- The power cord's inner wires are exposed, broken, etc.
- The power cord's coating has a crack.
- The power cord is overheating.
- The power cord is damaged.

If the above symptoms find, do not use the power cord and consult your dealer or service representative.

The following is the simple guide to avoid the hazard or disaster:

- Make sure Power cord is properly rated for their intended use, indoor or outdoor, and meet or exceed the power needs of the system being used.
- Inspect cords for damage before use. Check for cracked or frayed sockets, lose or bare wires, and loose connections.
- Never use a cord that feels hot or is damaged in any way.
- Insert plugs fully so that no part of the prongs is exposed when the power cord is in use.

Make sure that the power cord is connected to the system firmly, and then connect the plug to the wall outlet.

4.2   Installation Overview

As with any sophisticated communications device, installation of iPECS requires the care and forethought of a competent technician. Recommended installation proceeds in six (6) major steps:

- Site Preparation, section 4.3
- Equipment verification, section 4.3
- Module Mounting Hardware Installation, section 5
- Module Installation and Wiring, section 6
- Terminal Installation and Wiring, section 7
- System Programming and Verification

By utilizing the instructions that follow, the installation is quick and efficient. Directions for system programming and verification are given in the iPECS Admin & Programming Manual.

4.3   Site Preparation

4.3.1   General Site Considerations

The first step is to locate an acceptable site for the Module mounting hardware (Desk Mount Holder, Wall Mount Holder or Main Cabinet). When locating the mounting site, the following points must be considered:

The Main Cabinet can be Desk, 19" Rack or Wall mounted. When desk mounting, assure that the desk has ample strength to support the Main Cabinet and other hardware to be installed.

When wall mounting is desired, the cabinet **MUST NOT** be mounted directly to a masonry or plasterboard wall. A ½-inch plywood backboard should be firmly attached to the wall, and the cabinet and the MDFs should be mounted to the backboard.

The location must have access to an appropriate 100~240 VAC @ 50-60 Hz power source with a circuit breaker or fuse rated at 10 amps and must be surge protected. An appropriate grounded outlet should be within approximately 2 meters (6 feet) of the equipment location. When employing the Module Desk Mount Holder, an outlet will be required for each Module; a multi-outlet extension cord can be used.

The location must have access to a good protective earth ground, such as a metallic cold water pipe with no non-metallic joints. The ground source should be located as close as possible to the equipment.

The system should be located in a well-ventilated area with a temperature of around 20°C (68°F) and a relative humidity of 0-80% (non-condensing).

The equipment should be located within 8 meters (25 feet) of the telephone company's termination point. If the system is to share the LAN with data devices or be connected to an external VoIP network, the system must be within 100 meters (330 feet) of the WAN connection. Also, the location should be within the prescribed station loop lengths for all phones and terminals. If existing cabling is employed, the location of existing cabling and conduits should be considered.

The location should have adequate accessibility, space and lighting for future servicing and should consider the need for future expansion.

The site should be away from radio transmitting equipment, arc-welding devices, copy machines, and other electrical equipment capable of generating high levels of electrical interference. The system should be protected from flooding and heavy machinery as well as excessive dust and vibration.

Also, if installing DECT, locate the best-estimated position for the Base Stations. The permanent location of the Base Station will be determined using the GDC-600BTE CSR Tool to perform a RF coverage survey.

4.3.2   Verify Equipment On-site

Once the equipment installation site has been identified and a dedicated AC outlet, protective earth ground, lighting and ventilation are available, verify that all equipment and tools required are on-site and the equipment has not been damaged during shipment. Assure there is no shipping damage.

Check that the type and quantity of Modules and terminals received are correct. Also, assure any optional equipment and a Power Line Surge Protector are on-site.

The individual Modules and terminals need not be unpacked at this time.

If any equipment appears damaged or missing, notify appropriate personnel to correct the situation.

5 Module Mounting Hardware Installation

5.1   Enhanced Main Cabinet Installation

The Enhanced Main Cabinet can be desk, 19" rack or wall mounted. The following paragraphs provide directions for each of the mounting options as well as installation and removal of the front cover.

5.1.1   Cover Close/Open

The front cover is provided as standard equipment with the Main Cabinet. The cover hooks and snaps on to the cabinet as follows:

1)   Align the notched tab on the right side of the cover with the slot in the right side of the cabinet as shown in Figure 5.1.1-1 below.

2)   Push the tab into the corresponding slot in the cabinet.

3)   Slide the cover to the right to engage the notched tabs.

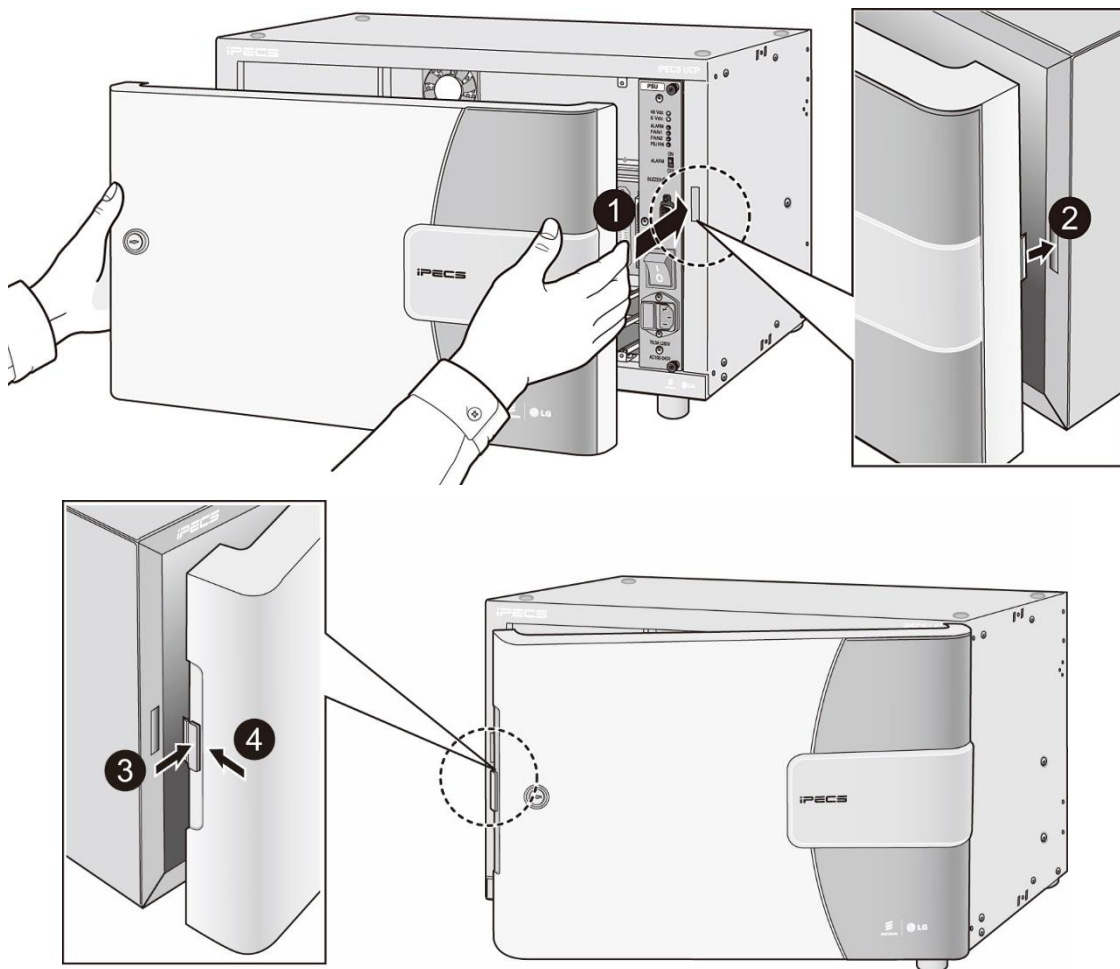4)   Swing the left side of the cover closed over the cabinet engaging the cover latch.

Figure 5.1.1-1Cover installation

To remove:

1)   Push the button on the left side of cover to disengage the latch. Refer to Figure 5.1.1-2.

2)   Swing the left side of the cover open slightly.

3)   Slide the cover to the left to disengage the notched tab.

4)   Pull the cover away from the cabinet.
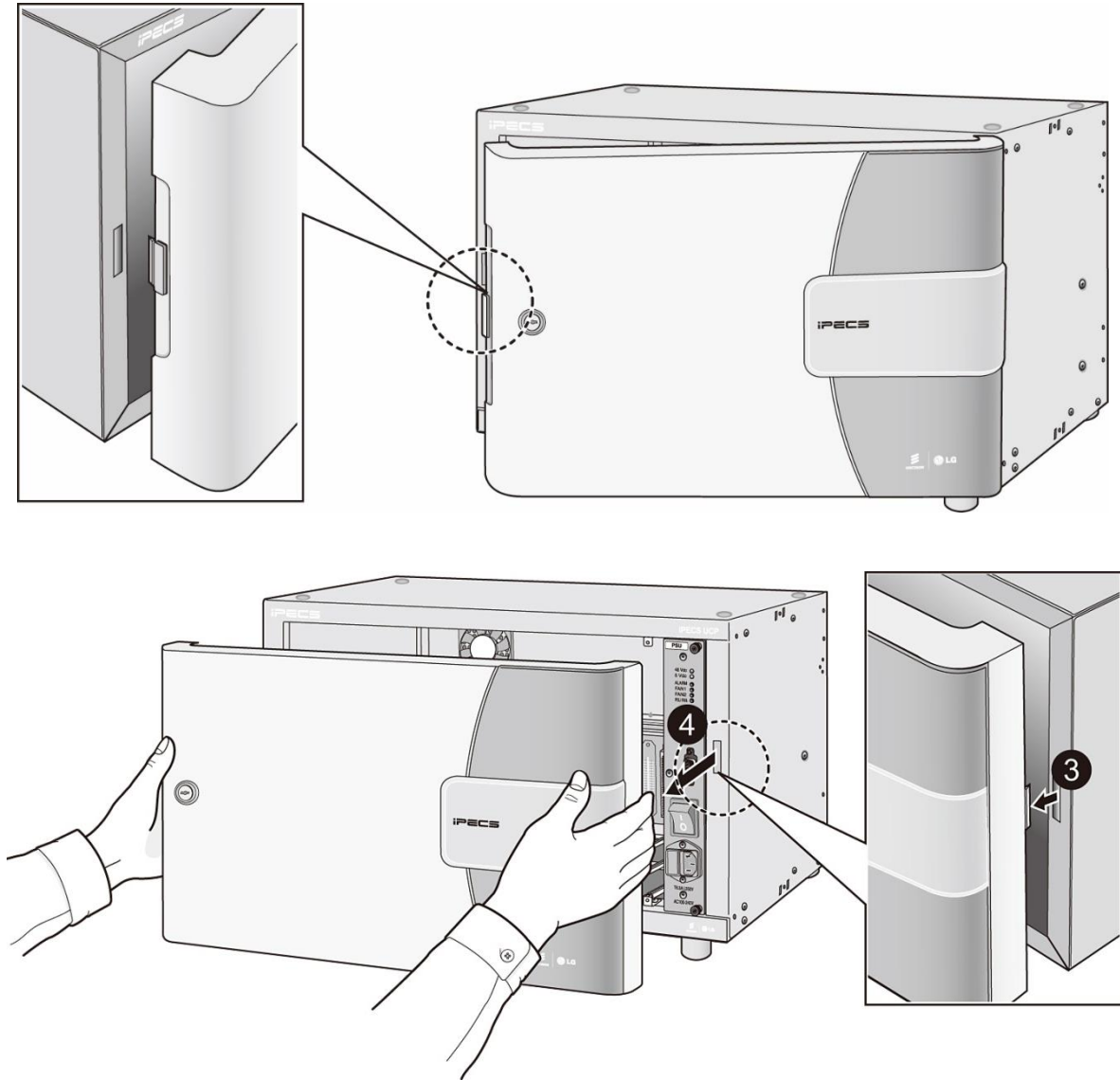

Figure 5.1.1-2 Cover removal

5.1.2   Cabinet 19" Rack Installation

Rack mount brackets are provided as standard equipment with the cabinet. These brackets attach to the front sides of the cabinet.

To rack mount the cabinet:

1)   Bolt the Rack mount brackets securely to the sides of the cabinet with the four (4) M4 x 6 mm machine screws supplied. Refer to Figure 5.1.2-1.

2)   Connect the brackets to a standard 19" rack securely with four (4) appropriate machine screws, nuts and lock-washers.
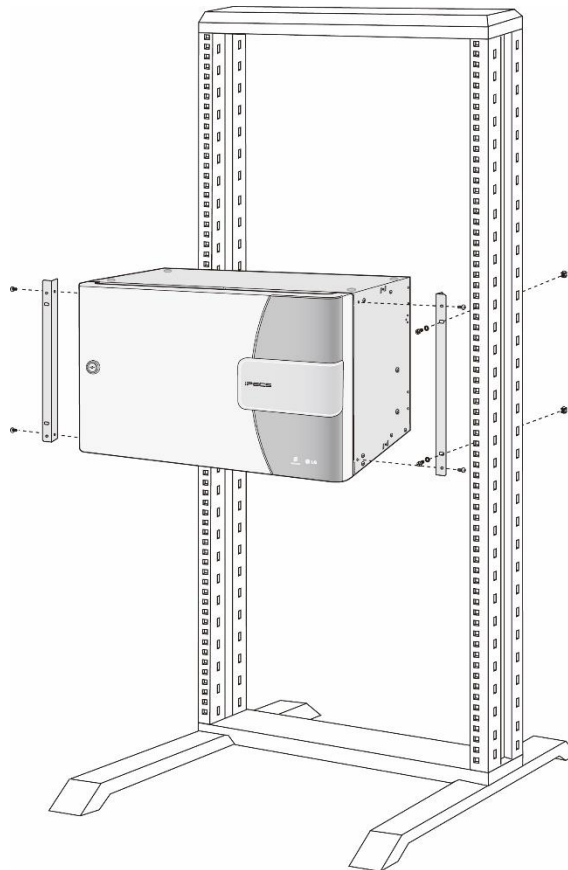

Figure 5.1.2-1 Rack (19") Installation

5.1.3   Cabinet Wall Mount Kit Installation

If the cabinet is to be wall mounted, a wooden backboard **MUST** be installed when the location has masonry or plasterboard walls. This backboard is recommended for all Wall Mount installations. A ½-inch plywood material is sufficient for most installations. The backboard should be mounted at a convenient height, about one (1) meter above the floor, and be bolted to wall-studs in a number of places to distribute the weight of the system.

Space should be available on the backboard for separate Telephone and LAN wiring distribution frames (MDF) and for optional equipment such as music sources, etc.

The optional Cabinet Wall Mount kit mounts to the wall then the cabinet is attached to the Wall Mount kit. The Wall Mount kit permits the cabinet to swing on hinges for access to the back plane telephony cabling. The hinges may be placed on either side of the cabinet prior to installation. Select the hinged side for maximum

clearance and lighting. Also, to keep the cabinet from swinging open, a latch is provided. Follow the steps below and Figure 5.1.3-1 for installation.

1) Disassemble the hinges by separating the hinge body and removing the hinge pin.

2) Mount the separated hinge bodies, two to the Wall Mount bracket and two to the cabinet using the M6 x 8 mm machine screws; two (2) for each hinge body provided.

3) Use the Wall Mount kit to mark the location of four (4) mounting holes for the Wall Mount kit as shown in Figure 5.1.3-1. Assure the Wall Mount holes are level and plum.

4) Drill four (4) 7 mm holes for the plastic wall anchors provided.

5) Fully Insert a wall anchor into the each of the four (4) holes, insert and tighten screws leaving about 6 mm (¼-inch) exposed.

6) Place the Wall Mount kit on the four (4) screws and tighten the screws securely.

7) Insert the hinge pins and mount the cabinet to the Wall Mount kit by aligning the hinge bodies with the hinge pins and lower into place.

8) Finally, mount the Cabinet Latch to the Wall Mount bracket and cabinet using the six M3 x 6 mm screws provided. The latch must be installed on the side opposite of the hinges.
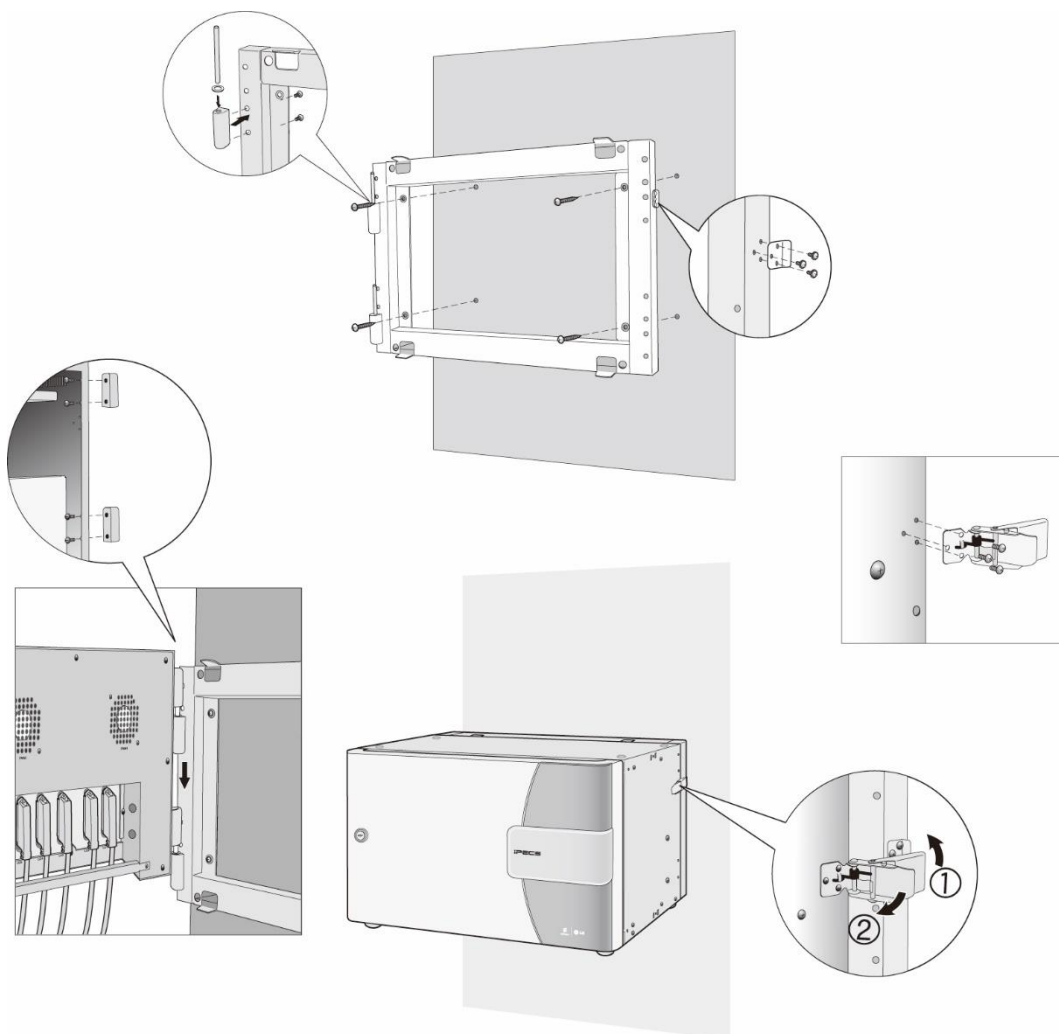

Figure 5.1.3-1 Cabinet Wall Mount Kit Installation

5.2   Main Cabinet Grounding

⚠ CAUTION

Before connection to AC power, the cabinet must be connected to a protective earth ground in conformance with the appropriate IEEE recommendations. A protective earth ground is required for user safety and minimizes EMC interference

To ensure proper system operation and for safety purposes, a good protective earth ground is required. A metallic COLD water pipe usually provides a reliable ground. Carefully check that the pipe does not contain insulated joints that could isolate the ground path. If insulated joints exist, another protective earth ground source must be used or, if codes allowed, the joints may be bridged.

A 12 AWG UL type 1015 or larger copper wire is recommended as the protective earth ground wire. However, check the appropriate national and local codes for proper conductor type and size. The wire should be kept as short as possible; it is recommended that the wire be no longer than 1 meter (about 3.3 feet).

The permanent protective earth ground "⏚" must be connected to the backplane of the Cabinet using #12 AWG or larger UL-1015 type copper wire. The protective earth ground terminal of the cabinet is located on rear bottom left side of the cabinet as shown in Figure 5.2-1.

The permanent protective earth ground "60417-1-IEC-5019" must be connected to the backplane of the cabinet using #12 AWG or larger UL-1015 type copper wire. The protective earth ground terminal of the cabinet is located on rear bottom left side of the cabinet.

Loosen the "⏚" terminal sufficiently to insert the Ground wire and re-tighten the terminal securely.
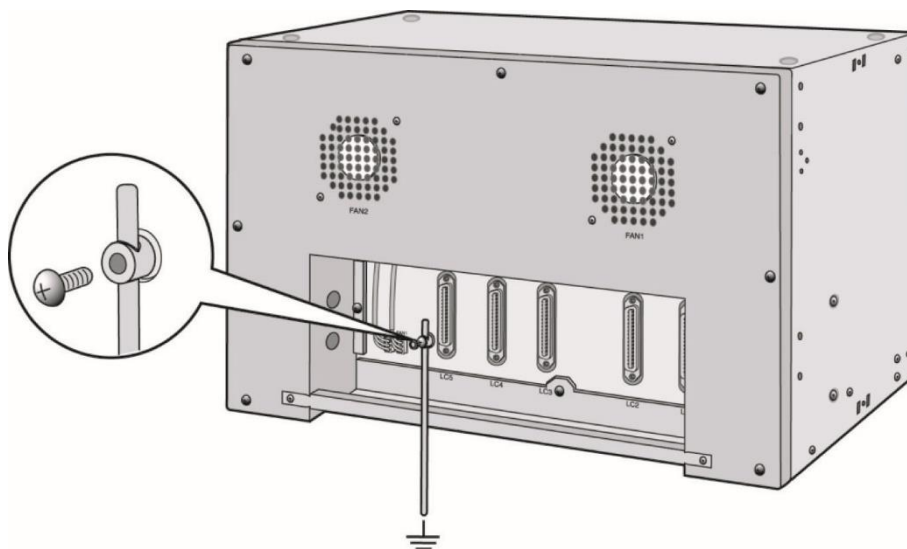

Figure 5.2-1 MCKTE Grounding

5.3   Main Cabinet PSU Installation

The Power Supply Unit (PSU) is factory installed in slot 10 of the Enhanced Main Cabinet. A back-up power supply may be installed in slot 9 to provide redundant power operation. When a back-up PSU is installed, should the main PSU fail, the back-up PSU immediately provides power to all of the Modules in the Main Cabinet.

Prior to turning the power switch ON, verify the PSU is capable of powering the cabinet, all modules and any Powered Devices connected to any ES8GP switch in the cabinet.   Refer to 2.4.4.2 for details.

LEDs
The PSU has six LEDs on the front panel to display the status of PSU and fans in the Main Cabinet. The function of each LED is shown in Table 5.3-1.

Table 5.3-1 PSU Status LED Functions

LED	LED FUNCTION
48Vdc	ON when -48Vdc is OK
5Vdc	ON when 5Vdc is OK
ALARM	ON when -48Vdc or 5Vdc fail
FAN1	ON when FAN1 fails.
FAN2	ON when FAN2 fails.
PSU FAN	ON when PSU FAN fails.

Alarm Switch
The PSU has a slide switch on the front panel. This switch activates/deactivates the local audio alarm indication from the buzzer. If a local audio alarm indication is desired, the switch should be in the ON (up) position. If no local audio alarm indication is desired, the Alarm switch should be in the OFF (down) position.

RS-232 Connector
The PSU outputs status and alarm information over the RS-232 DB9 connector. Use the serial cable provided with the cabinet to interconnect the PSU and the monitoring gateway Module. The monitoring gateway Module is defined in the Cabinet Attributes Web Admin page. When a back-up PSU is installed, the serial cable should be connected between the back-up PSU and the monitoring gateway Module or between the main PSU in slot 10 and the monitoring gateway Module. Note that when employing a WTIM as the notifying gateway Module, Dipswitch 3 of the WTIM, the Serial Mode switch, must be set to OFF, the Main CPU Serial mode.

Power Switch and AC Power Input
The PSU has a fused AC Power Input and switch that turns AC power to the PSU ON and OFF. The T6.3A L250V fuse is installed in the fuse holder below the AC input connector. Should the fuse fail replace only with a T6.3 A L250V fuse.

The main PSU is installed as described below and shown in Figure 5.3-1.

1)   Slide the PSU into slot 10 of cabinet t to engage the back-panel connector fully.
2)   Fasten the PSU by tightening the upper and lower thumbscrews on the front of PSU.
3)   Plug the power cord into AC power input on the front of PSU.
4)   To activate monitoring of the PSU and cabinet fans, connect the supplied serial cable from the DB9 connector of the PSU to the gateway Module defined in the System Data Cabinet Attributes.

Refer to Figure 5.3-3. Note when employing a WTIM as the notifying gateway Module, Dipswitch 3 of the WTIM, the Serial Mode switch, must be set to OFF, the Main CPU Serial mode.
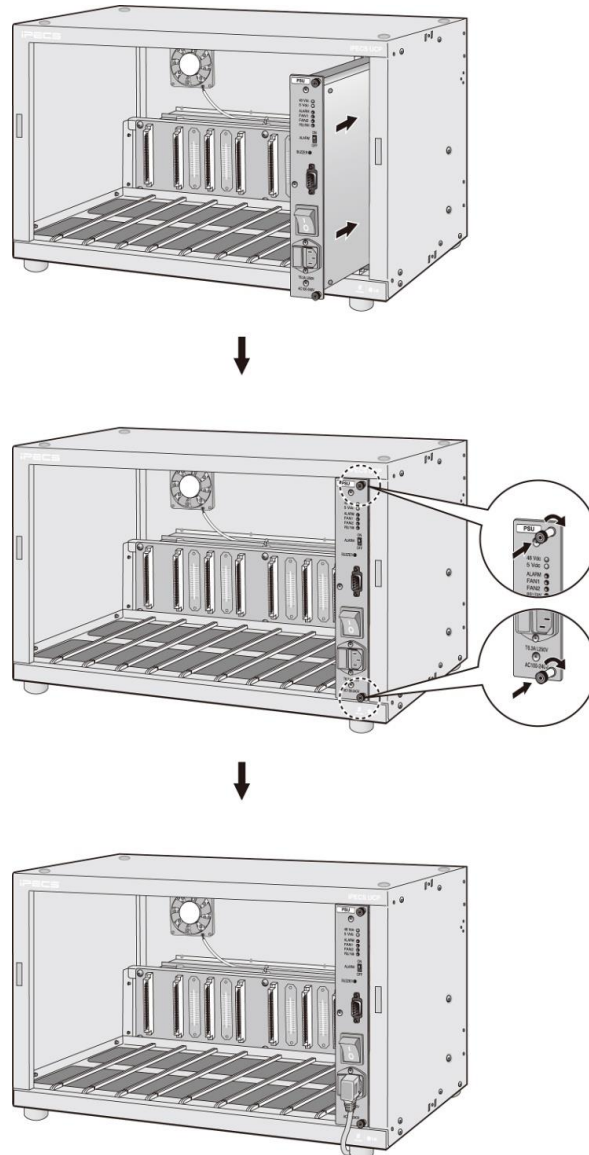

Figure 5.3-1 Main PSU Installation

The back-up PSU for power redundancy is installed as described below and shown in Figure 5.3-2.

1)　Complete installation of the Main PSU as described above.

2)　Using the screws provided, install the upper and lower PSU thumbscrew brackets to the right of the slot 9 slides as shown in Figure 5.3-2.

3)　Slide the back-up PSU into slot 9 of cabinet fully engaging the back-panel connector.

4)　Fasten the PSU by tightening the upper and lower thumbscrews on the front of PSU into the installed brackets.

5)　Plug the power cord into AC power input on the front of PSU.

6)　To activate monitoring of the PSU and Main Cabinet fans, connect the supplied serial cable from the DB9 connector of the PSU to the monitoring gateway Module defined in the System Data Cabinet Attributes.

Refer to Figure 5.3-3. Note that when employing a WTIM as the notifying gateway Module, Dipswitch 3 of the WTIM, the Serial Mode switch, must be set to OFF.
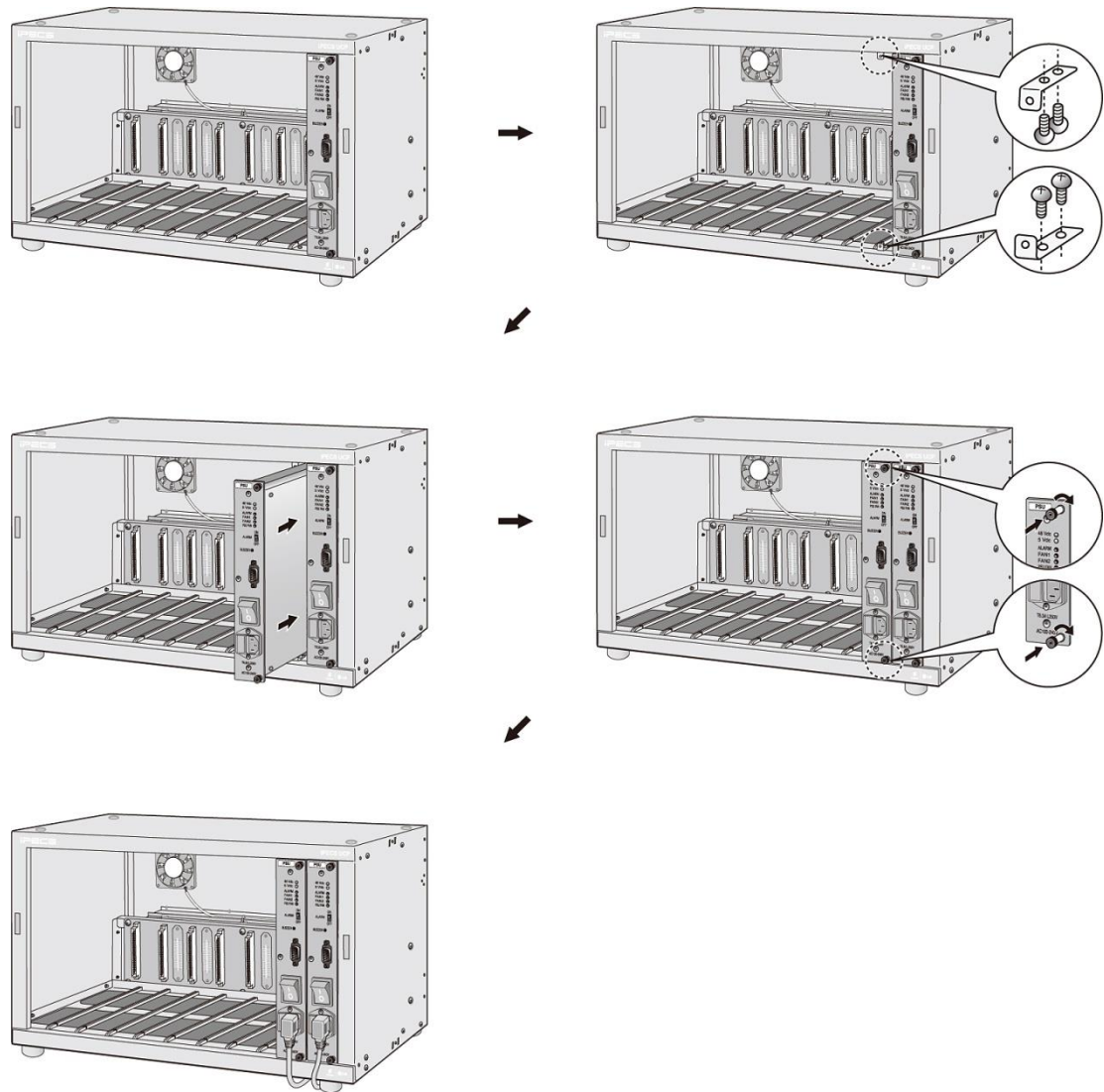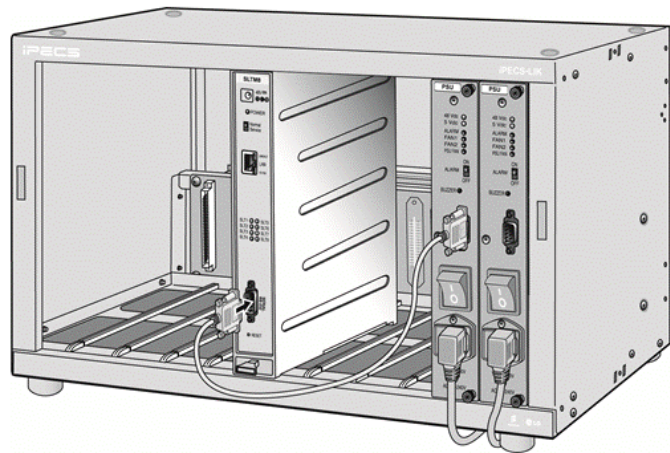

Figure 5.3-2 Back-up PSUs Installation

Figure 5.3-3 Monitoring cable Installation

5.4   Module Desk Mount Holder Kit

To assemble the Desk Mount Holder, refer to the instructions below and Figure 5.4-1. Note a Desk Holder Extender is required for each Module.

1)   Place the keyhole slots on the side of the Extender over the keys on the side of the bookend.

2)   Slide the Extender and bookend in opposite directions to the locked position.

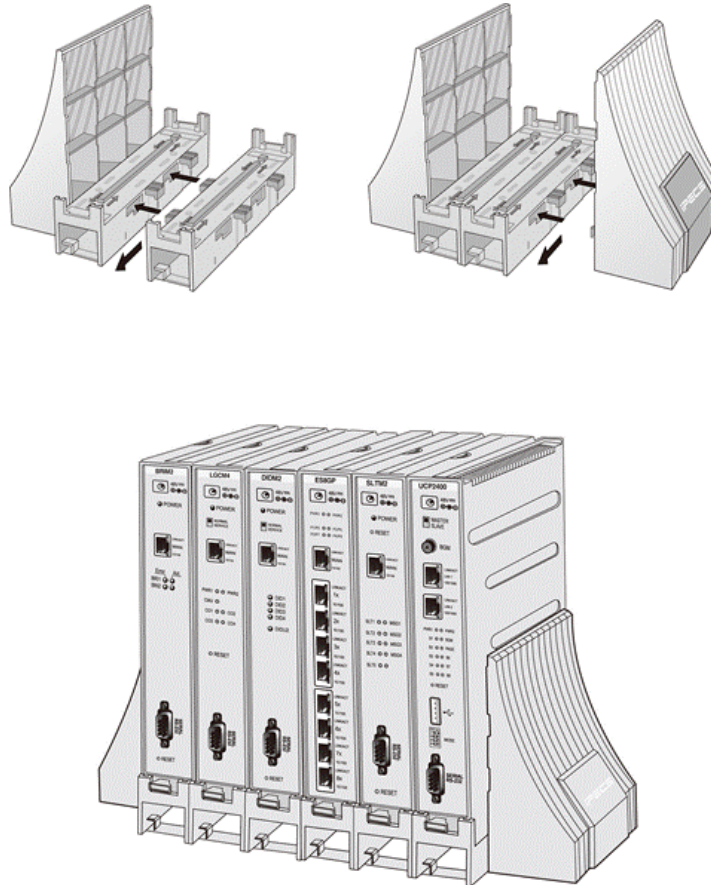3)   Repeat for additional Extenders and the other bookend.

Figure 5.4-1 Module Desk Mount Holder Kit

Once assembled, Modules are simply placed in the Desk Holder "slots". The front of all Modules should be placed in the same side of the Desk Holder.

5.5   Module Wall Mount Holder Kit

The Module Wall Mount Holder will house a single Module. To install, refer to Figure 5.5-1 and instructions below:

1) Place the Wall Mount Holder in position and mark two (2) holes over a wall stud.

2) Drill two (2) 7 mm holes for the plastic wall anchors provided.

3) Insert the two (2) anchors into the holes, then insert and tighten the screws leaving about 6 mm (¼ -inch) exposed.

4) Arrange wiring in the back of the Wall Mount Holder.

5) Place (hang) the Wall Mount Holder on the screws and tighten securely.

6) Slide the Module into the Wall Mount Holder until it locks.

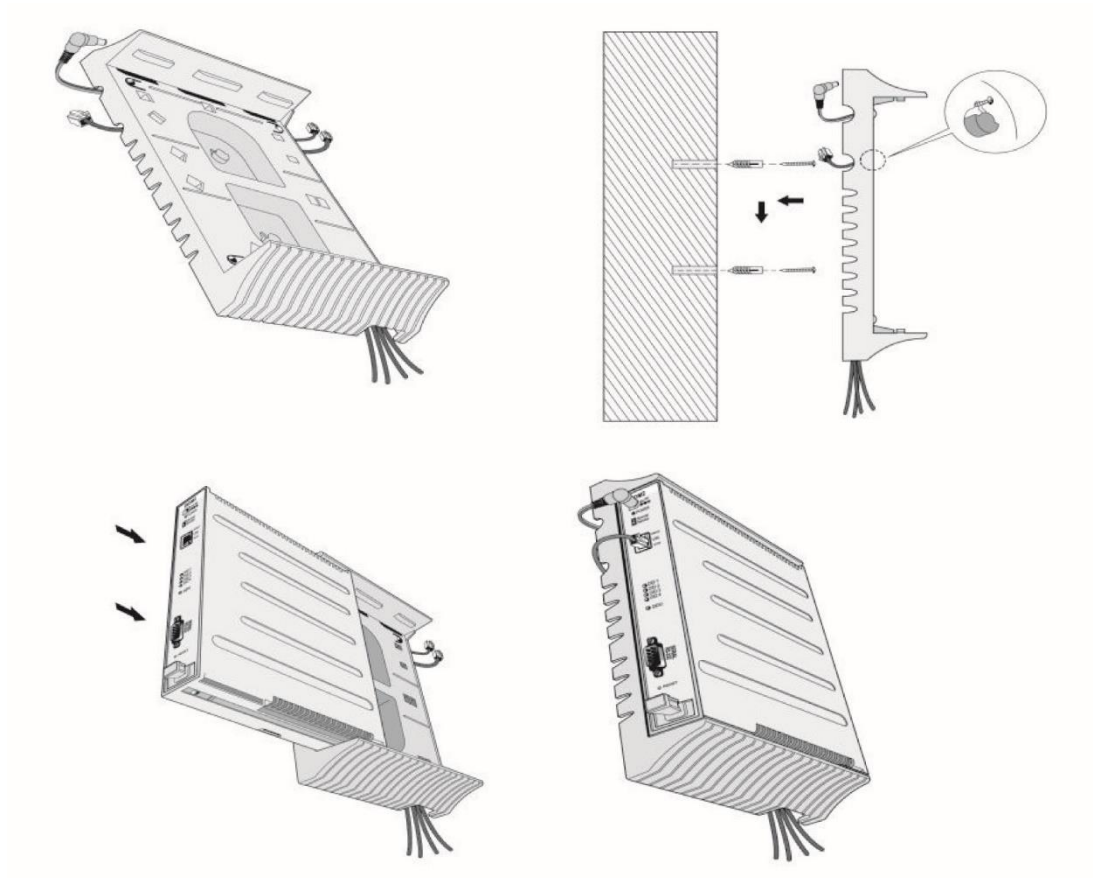7) Connect all wiring to the Module as appropriate. Refer to section 6.

Figure 5.5-1 Module Wall Mount Holder Kit

5.6   1U-Rack Mount Bracket Installation

The Module 1U-Rack Mount Bracket will house a single Module and an AC/DC adapter to power the Module.
To install, refer to figures and instructions below:

1)   Install the AC/DC adapter in the 1U-RMB. Refer to Figure 5.6-1.
   - Remove the two (2) screws on the rear of 1U-RMB to release the upper housing.

   - Lift up and remove the upper housing.

   - Remove the two (2) screws holding the adapter bracket.

   - Lift up and remove the adapter bracket.

   - Install an adapter, the label side of the adapter should be placed on the inner surface of 1U-RMB),
     place the adapter bracket over the adapter and fasten the two 2) screws.

   - Insert the adapter DC plug through the hole in the front of 1U-RMB. Note for the RSGM, the DC cable
     should exit through the hole in the rear of the 1U-RMB.

   - Insert the rubber grommet over the DC adapter cable and insert the grommet in the hole in the front of
     the housing.

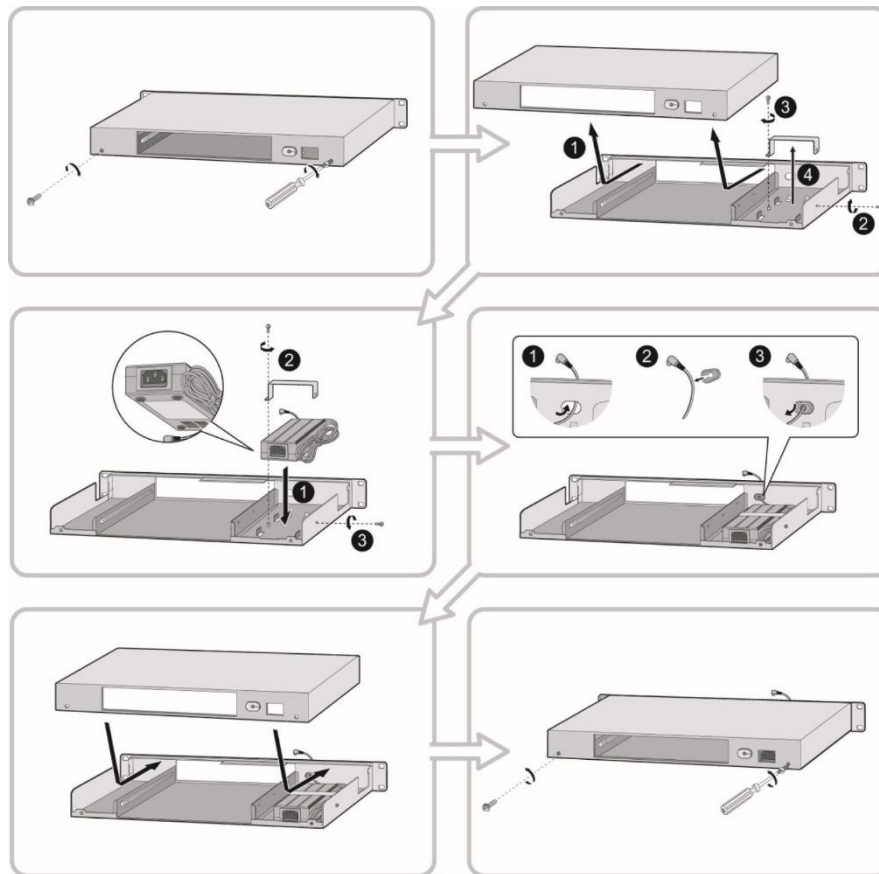   - Replace the upper housing and fasten the two (2) screws.

Figure 5.6-1 1U RMB Adapter Installation

2)   Install the gateway Module into the 1U-RMB and connect the adapter plug. Refer to Figure 5.6-2.
   - Slide the Module into the 1U-RMB.

   - Place the Ferrite core over the DC cable and close the core over the cable. For the RSGM, the DC
     cable must exit the rear of the 1U-RMB. For all other modules, the DC cable must exit the front of the
     1U-RMB.

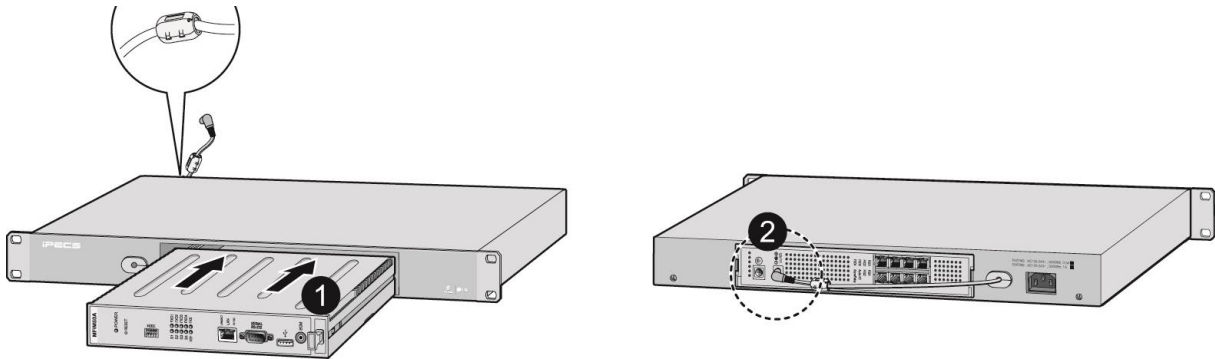- Connect the adapter DC plug to the gateway Module.

Figure 5.6-2 1U-RMB Gateway Installation

3) Install the 1U-RMB in a standard 19" rack securely with four (4) appropriate machine screws, nuts and lock-washers. Refer to Figure 5.6-3.

4) Wire the Module as described in section 6.

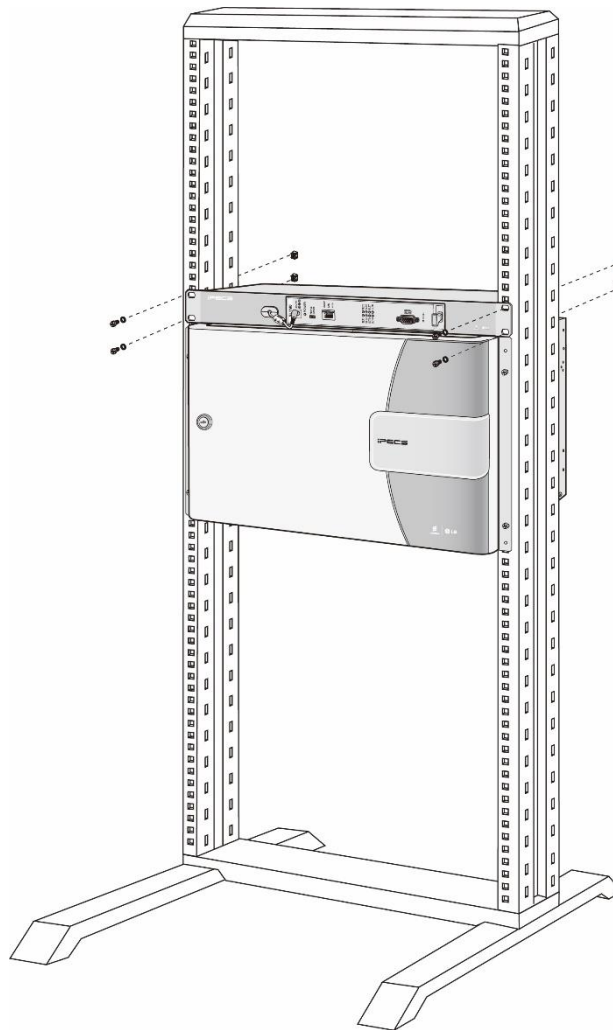5) Connect the AC cable to the adapter and wall outlet to power the Module.

Figure 5.6-3 1U-RMB Rack-mount Installation

6 Module Installation and Wiring

6.1 Module Handling and General Installation

The following paragraphs provide general and common installation, and wiring practices and procedures for all Modules. Procedures such as LAN wiring are common for all Module LAN ports and are discussed here.

Prior to installation of any Module, it is recommended the installer be thoroughly familiar with the information in this section.

⚠ CAUTION

Modules must be installed in a Wall Mount Holder, Bookshelf Holder or the Main Cabinet for proper ventilation.

Do not stack Modules or limit airflow as this may cause over-heating, leading to pre-mature failure and/or faulty operation of the equipment.

6.1.1 Module Installation Sequence

A SEQUENCE NUMBER is assigned to all gateway Modules based on the registration order with the system, refer to the iPECS Admin & Programming Manual for further details.

This SEQUENCE NUMBER determines the logical CO Line and Station numbers assigned in the system database.

The system does not differentiate between the types of PSTN Module during initialization.

Thus, an LGCM4 installed first is assigned SEQUENCE NUMBER 01 with CO Line ports 1~4 and a VOIM8 installed second is assigned CO Line ports 5~12.

Although the SEQUENCE NUMBER in the database can be changed, connecting the gateway Modules to the iPECS in the desired sequence based on type of Module is recommended.

The Module SEQUENCE NUMBER can be easily established at installation by controlling the order of connection of the Module's LAN port to the system (LAN switch connected to the UCP's LAN 1 port).

Station numbers are also assigned consecutively based on the order the LIP Phone or station gateway registers with the system.

Since the first phone installed is assigned as the Admin Station (station number 100), it is recommended an LIP Phone be connected to the system prior to installing any SLT gateway Module.

6.1.2 Module Insertion/Removal

Modules are easily inserted into the cabinet; place the Module with front panel forward in the desired slot in the cabinet and slide the Module into the cabinet, engaging the connectors of the back panel and Module.

To remove a Module from the cabinet, pull on the Release knob while sliding the Module out of the cabinet. Refer to Figure 6.1.2-1.
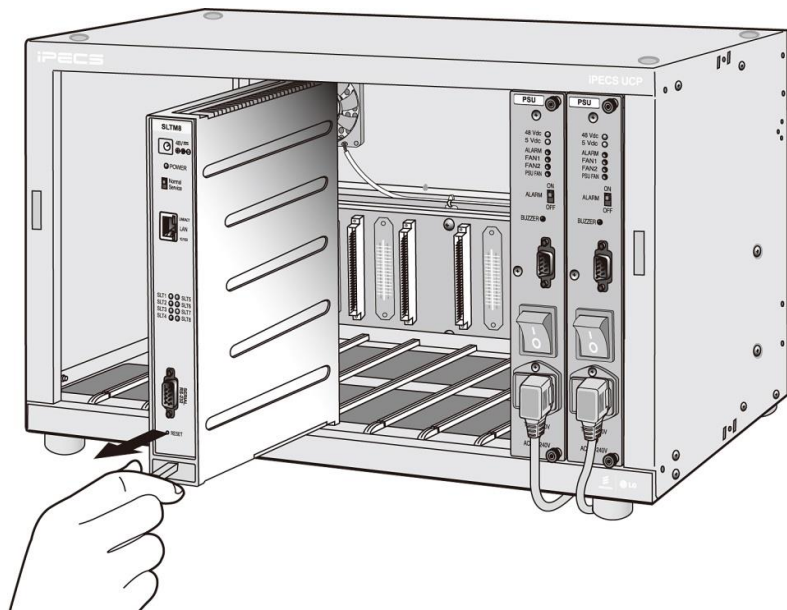
Figure 6.1.2-1 Module Insertion/Removal

6.1.3   Common Module Switches

With the exception of the ES8G/ES8GP, all Modules have a recessed Reset and a Normal/Service switch that is shown in Figure 6.1.3-1. These switches are employed for maintenance purposes. The Reset switch will restart the Module software, resetting only the scratch-pad memory. The Normal/Service switch activates a graceful shutdown of the Module, as busy circuits go idle they are marked as out-of-service. When all circuits of a module are out-of-service, the module can be removed without affecting operation of other modules in the system.
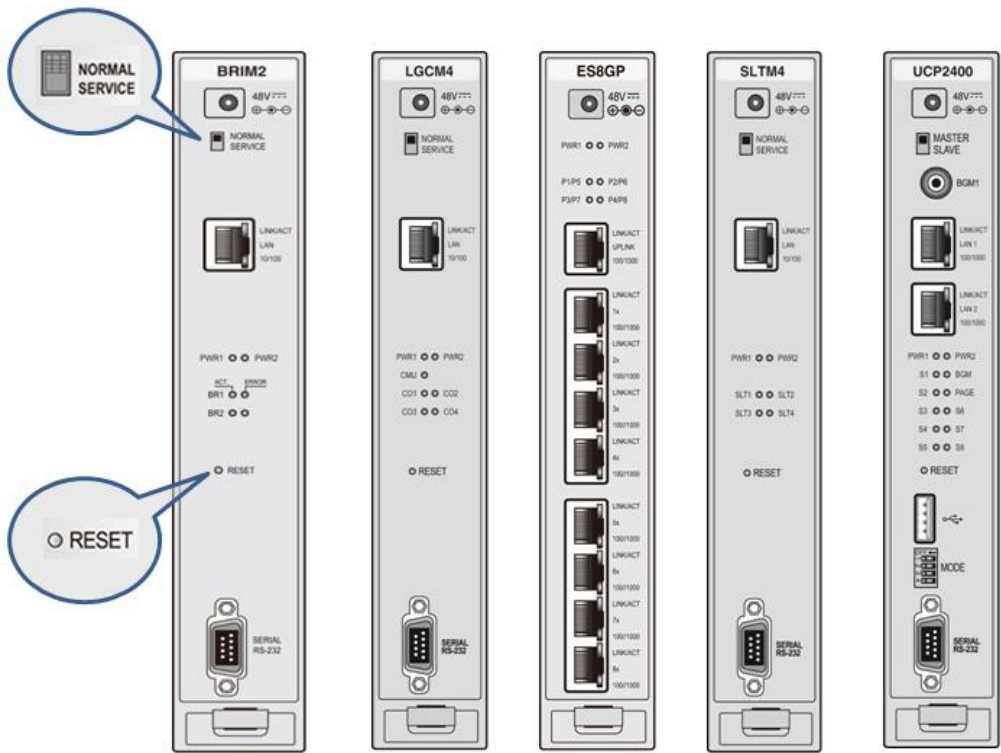

Figure 6.1.3-1 Common Module Switches

6.1.4 Module Grounding

As shown in Figure 6.1.4-1, a "⏚" or "⏚" screw is located on the rear panel of each Module. For proper operation and code compliance, the grounding screw MUST be connected to a known protective earth ground using a #12 AWG or larger UL-1015 type copper wire. The wire should be located between the toothed lock washer and the plain washer. Note that when using the cabinet, a separate ground connection to the individual Modules is not required.
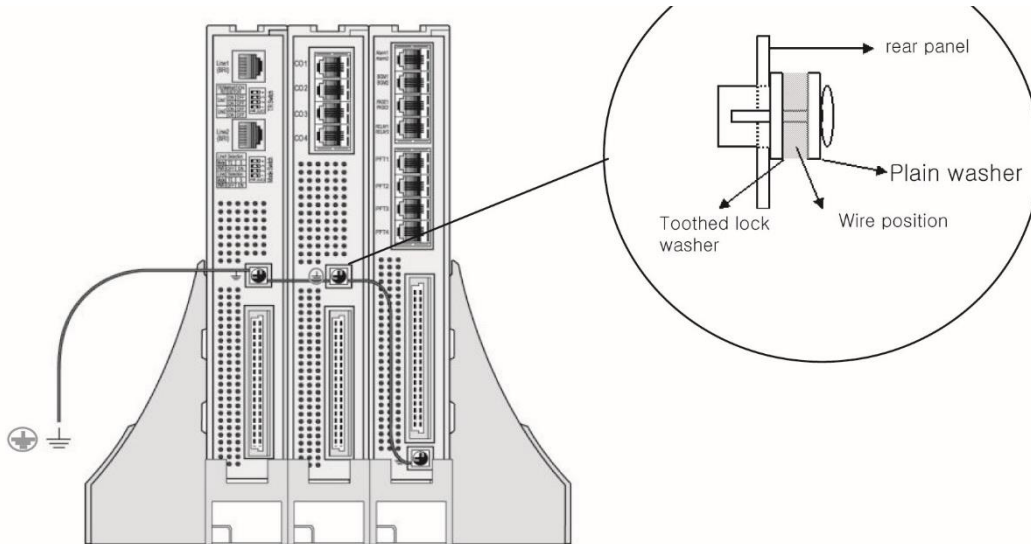
Figure 6.1.4-1 Module Grounding

⚠ CAUTION

When a module is installed in a Desk Mount Holder (DHLD) Wall Mount Holder (WHLD) or 1U-Rack Mount Bracket (1U-RMB), the protective earth ground must be connected to the earth ground terminal in rear of the module using #12 AWG or larger UL-1015 type copper wire.

6.1.5 Telephony Connections

In general, PSTN and SLT (telephony) connections are available on the rear of each Module, while LAN, power and RS-232 connections are on the front of each Module. Except where noted, telephony connections via RJ-11 or RJ-45 type jacks are wired as in Figure 6.1.5 1. All telephone wiring should use standard twisted pair 24 or 26 AWG wiring.

Figure 6.1.5-1 Telephony (RJ-11 or RJ-45) Connector Pin Assignment

⚠ CAUTION

To reduce the risk of fire, use only 26 AWG or larger UL List or CSA Certified Telecommunication Line Cord.

6.1.6   LAN Connections
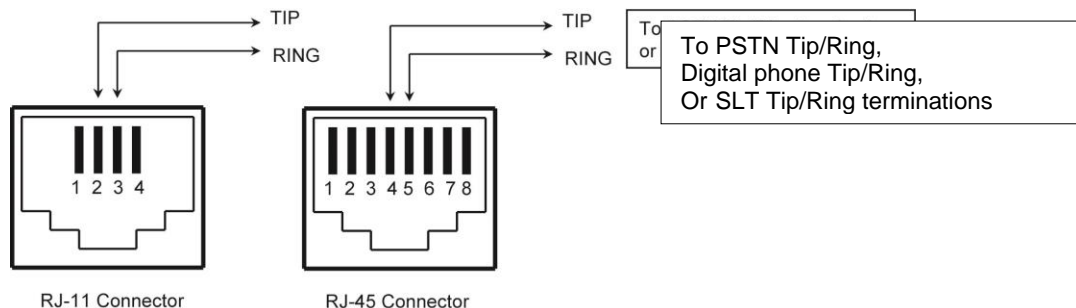
LAN connections are made by way of RJ-45 connectors on the front panel of each Module.

These connectors are shown in Figure 6.1.6-1 and Figure 6.1.6-2. Each connector has a green Link/Activity LED and a yellow LAN speed LED, ON for 1000 Base-T.

The ES8GP can provide power over the LAN with 48 VDC across pin pairs 1 & 2 (+) and 3 & 6 (-). This configuration mates with the LIP Phone as shown in the figure.

All LAN wiring (except UCPs, UVM, and Gigabit Switch) may use Category 5 Unshielded Twisted Pair (CAT 5 UTP) cable. No single run of LAN cable should exceed 100 meters (about 330 feet).
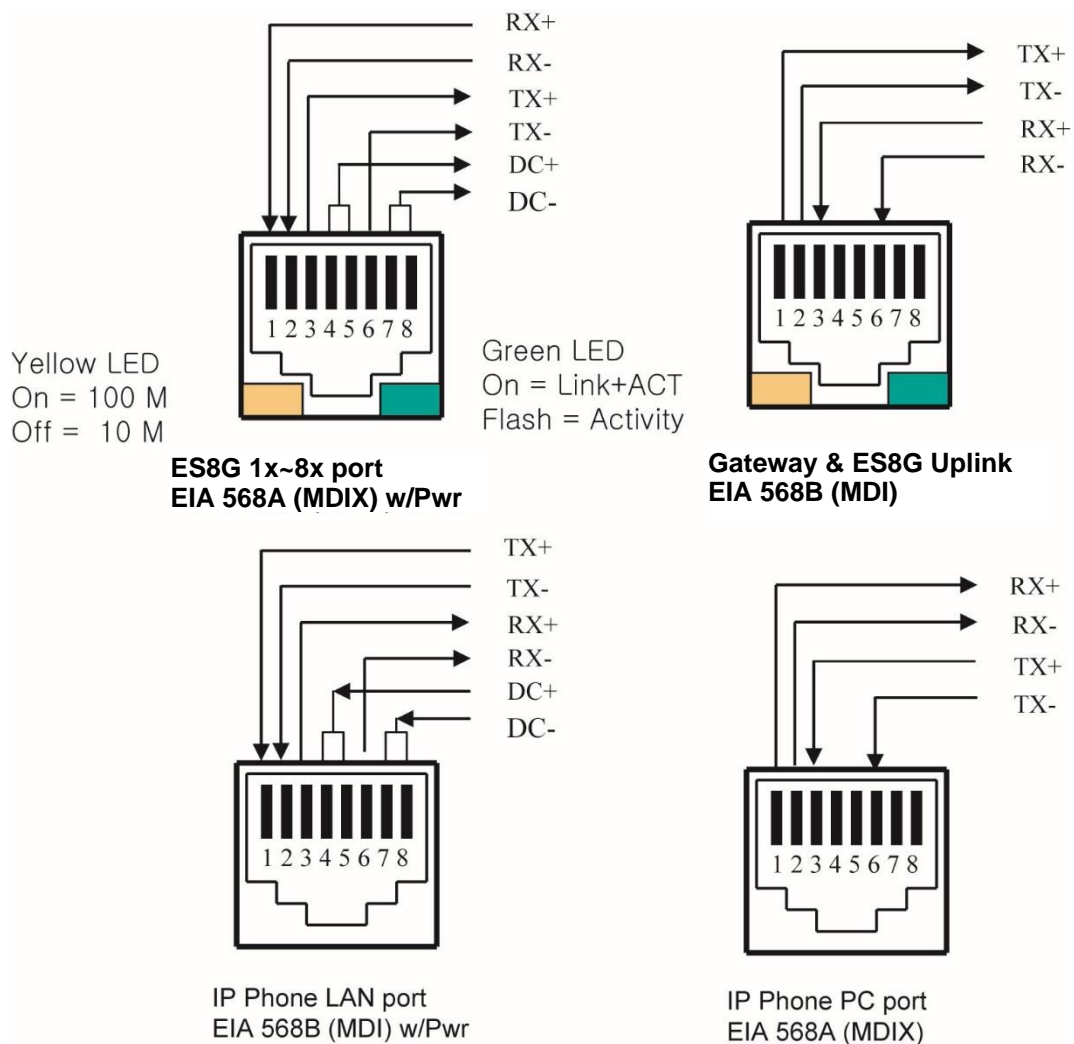

Figure 6.1.6-1 10/100 Base T LAN Connector (RJ-45) Pin Assignment

Gigabit LAN wiring should use Category 5e or 6 Unshielded Twisted Pair (CAT 5e or 6 UTP) cable. No single run of LAN cable should exceed 100 meters (about 330 feet).

The pin assignment of RJ-45 connector is given in the chart below and shown in Figure 6.1.6-2.

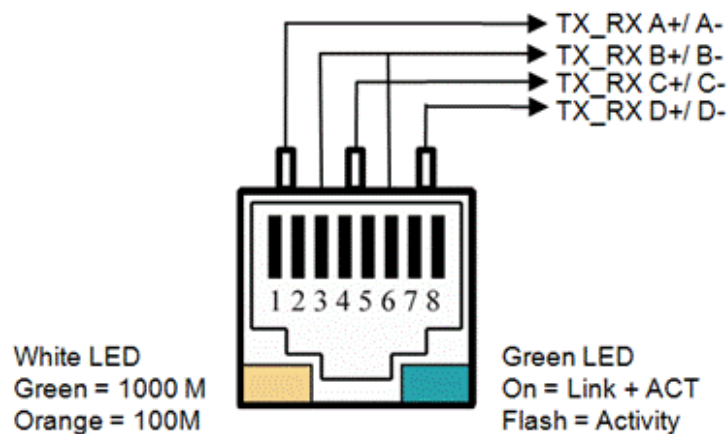| Pin	10/100BASE-T Mode A	10/100BASE-T Mode B	1000BASE-T Mode A	1000BASE-T Mode B
1	RX+/ DC+	RX+	TX_RX A+/ DC+	TX_RX A+
2	RX-/ DC+	RX-	TX_RX A-/ DC+	TX_RX A-
3	TX+/ DC-	TX+-	TX_RX B+/ DC-	TX_RX B+
4	Unused	DC+	TX_RX C+	TX_RX C+/DC+
5	Unused	DC+	TX_RX C-	TX_RX C-/DC+
6	TX-/ DC-	TX-	TX_RX B-/ DC-	TX_RX B-
7	Unused	DC-	TX_RX D+	TX_RX D+/DC-
8	Unused	DC-	TX_RX D-	TX_RX D-/DC-

Figure 6.1.6-2 Gigabit LAN Connector (RJ-45) Pin Assignment

6.1.7   LAN Wiring Structures

The LAN wiring architecture used for connecting iPECS Modules to the LAN is dependent upon several factors including:

- Shared or iPECS only LAN infrastructure
- External VoIP calling requirements
- New or existing voice and/or data installation
- Remote LAN power or local AC power for iPECS Phones

The "PC" LAN port of equipped LIP Phones can be connected to the user's desktop using a standard LAN cable terminated with RJ-45 LAN jacks.

The LAN jack is wired to an Ethernet switch, which has access to the iPECS UCP, other iPECS Modules and LIP Phones. This connection can be through a connection to the same switch or by an indirect connection through multiple switches.

For a new installation or, where LAN power to the LIP Phone is desired, the ES8GP can be employed for the corporate LAN.

For existing installations, it may be necessary to replace existing switches in a shared environment in order to provide remote power to the LIP Phones.

In the shared environment, both data and voice will have access to the WAN, which also permits external VoIP calling. In the non-shared LAN environments, the system must be connected to the WAN to support external VoIP connections.

Due to the advantages of the shared environment, support for remote LAN power, and external VoIP calling, the ES8GP, which is a standard Ethernet switch, should be employed.

The recommended structure, so called "hierarchal" wiring, employs all "straight" LAN cables (MDI to MDIX) as shown in Figure 6.1.7-1. Additional ES8GP Modules are connected using the UPLINK port to the switched ports of the primary ES8GP. A sufficient number of ES8GP modules are connected to provide the total number of ports required.

For example, in case of an 8-CO Line and 24-station configuration, the System would require 30 Ethernet switch ports (UCP = 1 port, LGCM8 = 1 port, ES8GP = 3 ports, LIP Phones = 24 ports, and router = 1 port), and would be structured as in the following Figure 6.1.7-1.
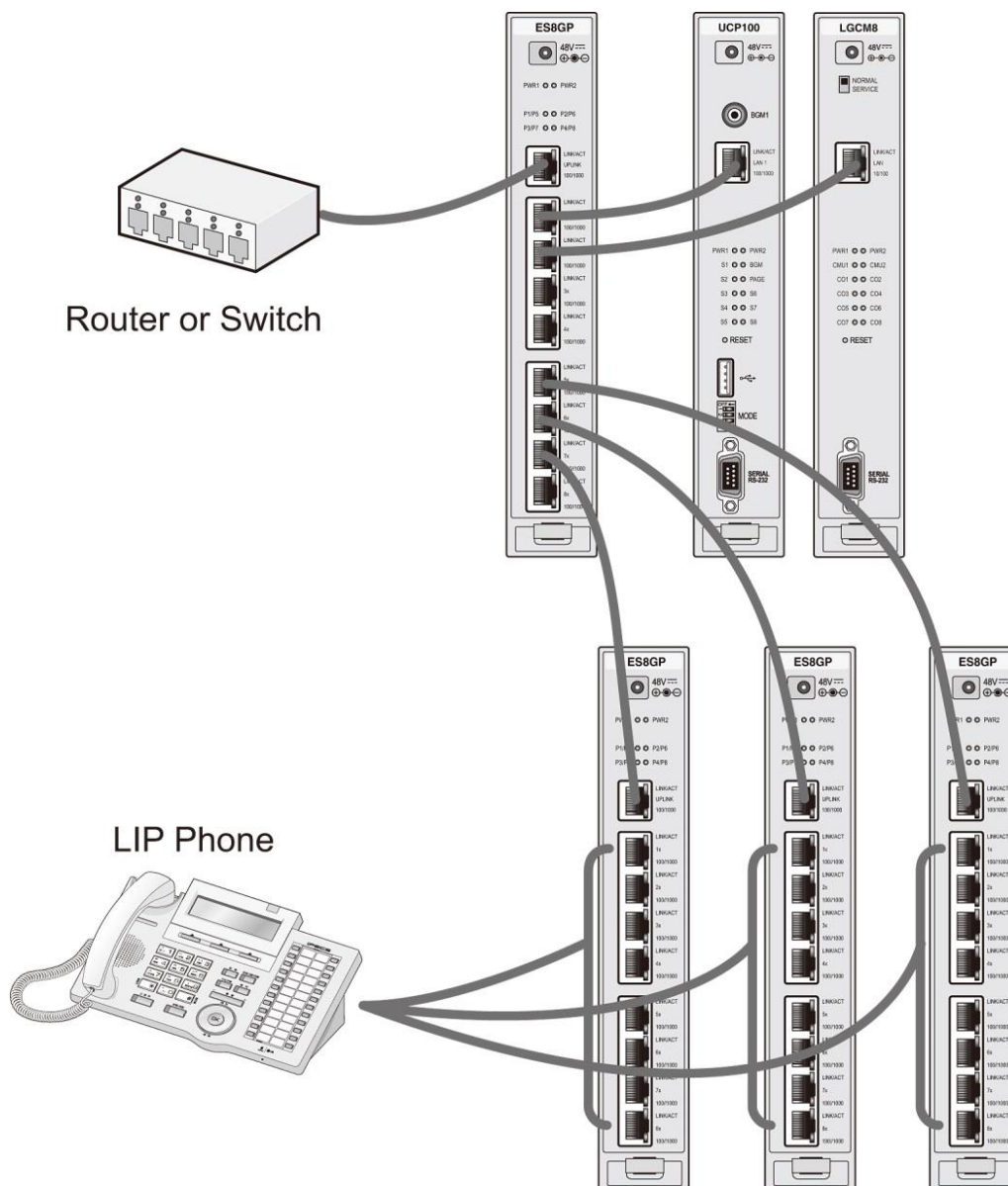
Figure 6.1.7-1 iPECS LAN Wiring

Cascading

When the station loop limit is beyond the 100-meter (330 feet) limit, switches may be cascaded to extend the range. For the ES8G/ES8GP, simply connect the extension switches with their UPLINK port to a LAN port of the previous ES8G/ES8GP in the cascade.

⚠️ CAUTION

Do not create a loop when connecting these switches to each other or other network components.
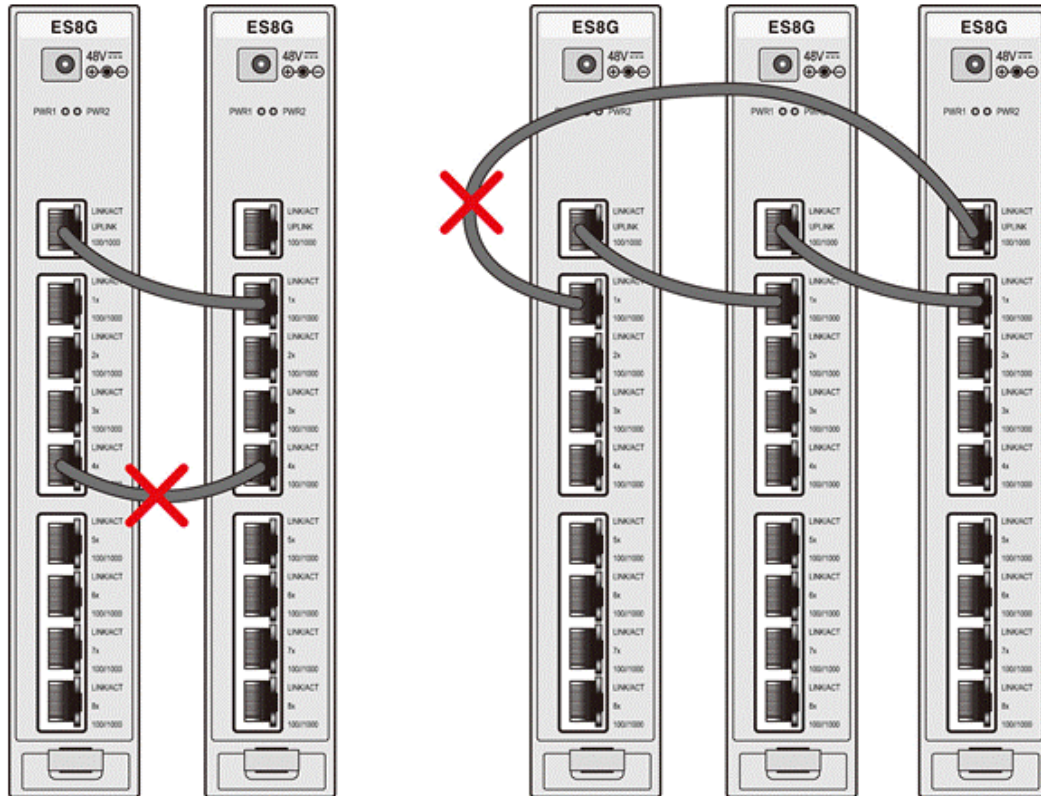

Figure 6.1.7-2 Erroneous Loop Wiring

6.1.8   RS-232 Connections

The DB-9 connector located on the front panel of each gateway Module is an RS-232 serial port. The connector is employed to provide system trace and diagnostic routines for the individual Modules. The iPECS UCP server modules have one such port, which may be assigned for the desired function (SMDR, ACD, etc.). Refer to the iPECS Admin & Programming Manual.

The RS-232 ports of the Modules and PSU are set-up for 8-bits, no parity, and one (1) stop bit running at 115,200 bps. To modify the speed and other settings, refer to the iPECS Admin & Programming Manual.

The RS-232 connectors for gateway Modules, ES8G/ES8GP and UCP modules are terminated in a Data Communications Equipment (DCE) configuration as displayed in Figure 6.1.8-1. The RS-232 connector in the PSU is terminated in a Data Terminal Equipment (DTE) configuration. Use a cable pre-terminated with DB-9 connectors to connect an appropriate device (terminal, printer, etc.) to the Module.
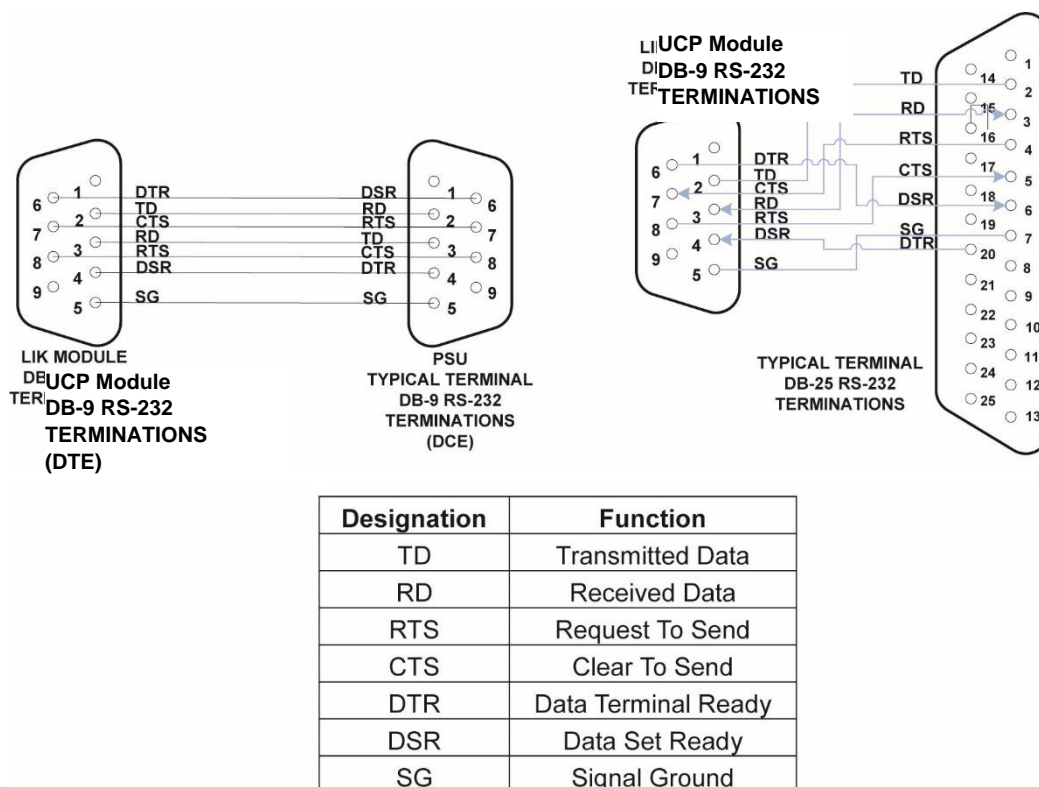

Designation	Function
TD	Transmitted Data
RD	Received Data
RTS	Request To Send
CTS	Clear To Send
DTR	Data Terminal Ready
DSR	Data Set Ready
SG	Signal Ground

Figure 6.1.8-1 RS-232 DB-9 Pin-outs

6.1.9   Module Power Adapter

Modules are shipped without AC/DC Adapters. Therefore, if an adapter is required, it must be ordered separately. The AC/DC Adapter converts local AC to 48 VDC for Module power. One side of the adapter has a 3-prong parallel blade male termination and mates with the power cord supplied. The AC power cord supplied is plugged into the adapter and into the local AC power source. See 5.4 for installing the module in a DHLD, 5.5 for WHLD or 5.6 for 1U-RMB.

The other end of the adapter is terminated in a DC power cord with a plug at the end. This DC power plug is inserted into the power input jack on the upper front panel area of each Module. Prior to making this power connection, assure the Module is properly grounded referring to section 6.1.4. The Power LED on the Module front panel will illuminate when power is applied.

6.2   UCP server Module Installation

There are several models of the UCPs, which are installed in the same manner. In this section, the reference to UCPs encompasses the various models of UCPs. The UCPs may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder.

All UCPs contain a long life Lithium battery, which protects the real-time clock in the event of a power failure.

LEDs

In addition to the Power and LAN LEDs, UCPs have ten LEDs for status and diagnostic information as in Table 6.2-1.

Table 6.2-1 UCP100/600/2400 Status LED Functions

LED	LED STATUS FUNCTION - ON -
S1	Serial/TCP debug active
S2	Call Processing active
S3	Active data communication with Modules and IP Phones
S4	LCD control active
S5	CPU active (100ms flashing)
BGM	BGM or internal MOH active
PAGE	Ext. Page1 or Ext. Page2 in use
S6	Reserved
S7	Redundancy active (flashing during DB download)
S8	MISC Active (Flashing)

Mode Switch & Settings

UCP modules have a four (4) position DIP-switch identified as the "MODE" switch. The function of each switch position is given in Table 6.2-2 below.

Table 6.2-2 UCP Mode Switch Functions

SWITCH	FUNCTION	ON	OFF
1	Database write protect	Protect, cannot modify	Unprotect, can modify
2	Reserved	-	-
3	Registration	Allow registration (Auto register new device)	Registration denied (Manual register only)
4	Initialization	Initialize DB on Reset	Read stored DB on Reset

To enter data in the system's database, the Write Protect switch must be in the OFF position. In the ON position, the database cannot be modified.

Thus, placing the switch in the ON position eliminates the potential for remote database modification. If remote data entry is not desired, after all installation and database entries are complete place the switch in the ON position.

When new gateway Modules and/or terminals are connected to a LAN, they will automatically attempt to register with an iPECS UCP. With the Registration switch (switch position 3) in the ON state, the system will recognize and respond to the registration request. With the switch in the OFF position, the system will not respond to the request.

During initial installation, the switch should be placed in the ON position to permit the system to recognize and respond to registration requests. If it is desired to deny future registrations, the switch should be placed in the OFF position.

This is useful when multiple systems may be connected to the same LAN. For details on gateway Module and terminal registration, refer to iPECS Admin & Programming Manual.

The system database is initialized based on switch position 4. In the ON position, the system will load default values in the system database when power is applied to the UCP or the Reset button is pressed.

Note if the system looses power for any reason with the switch in the ON position, the database will be initialized. Place the switch in the ON position then, after completing the system wiring and prior to any database entries, place the switch in the OFF position.

For a description of the initialization process, refer to the iPECS Admin & Programming Manual.

<u>Wiring Connectors</u>

Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the UCP are the "LAN 1" and, for the UCP600 and UCP2400, "LAN2" RJ-45 type connectors. These connectors should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

Wire "LAN 1" to a 10/100/1000 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.

For UCP 600 or UCP2400 redundant processor operation, wire "LAN 2" of main and back-up UCP. When the iPECS UCP modules are local, the LAN2 connectors of the modules can be directly connected. Note Admin is required to configure redundancy, refer to the iPECS Admin & Programming Manual.

Tag or number wiring for maintenance.

For the iPECS UCP100 module, the eight (8) RJ-45 connectors on the rear panel are terminated for miscellaneous functions, and the CO/BRI option board and the two (2) FXS (SLT) ports. Wire these connectors as depicted in the sketch of Figure 6.2-1. Table 6.2-3 provides the connector terminations in tabular form.

These CO/BRI connections are available from the Main Cabinet RJ-21x connectors (6.18) using the wiring shown for the slot where the UCP100 is located. Note Jack splitters are provided with the iPECS UCP100 CO/BRI option board to allow a more direct termination. To use the Jack splitters see 6.2.1.

Table 6.2-3 Optional COIU4 & BRIU2/4 RJ-45 Pin assignment

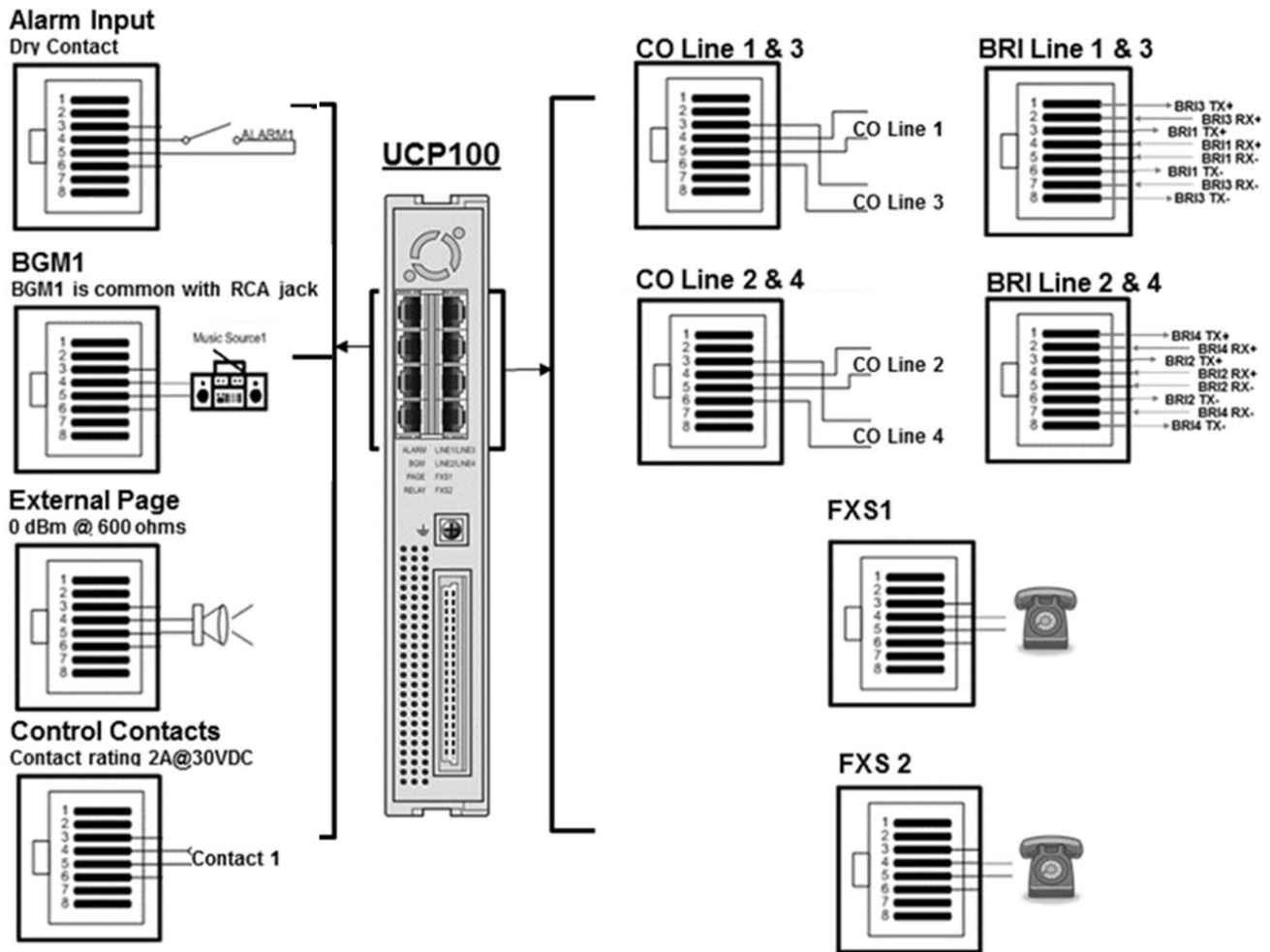| RJ-45 Pin	CO Line		BRI Line	
	RJ-45 1	**RJ-45 2**	**RJ-45 1**	**RJ-45 2**
1	N.C.	N.C.	BRI3_TX+	BRI4_TX+
2	N.C.	N.C.	BRI3_RX+	BRI4_RX+
3	CO3_R	CO4_R	BRI1_TX+	BRI2_TX+
4	CO1_R	CO2_R	BRI1_RX+	BRI2_RX+
5	CO1_T	CO2_T	BRI1_RX-	BRI2_RX-
6	CO3_T	CO4_T	BRI1_TX-	BRI2_TX-
7	N.C.	N.C.	BRI3_RX-	BRI4_RX-
8	N.C.	N.C.	BRI3_TX-	BRI4_TX-

Figure 6.2-1 UCP100 Miscellaneous & Telephony Connections

For the iPECS UCP600 and UCP2400 modules, the eight (8) RJ-45 connectors on the rear panel are terminated for miscellaneous functions and Power Fail functions. Wire these connectors as depicted in the sketch of figure 6.2-2.
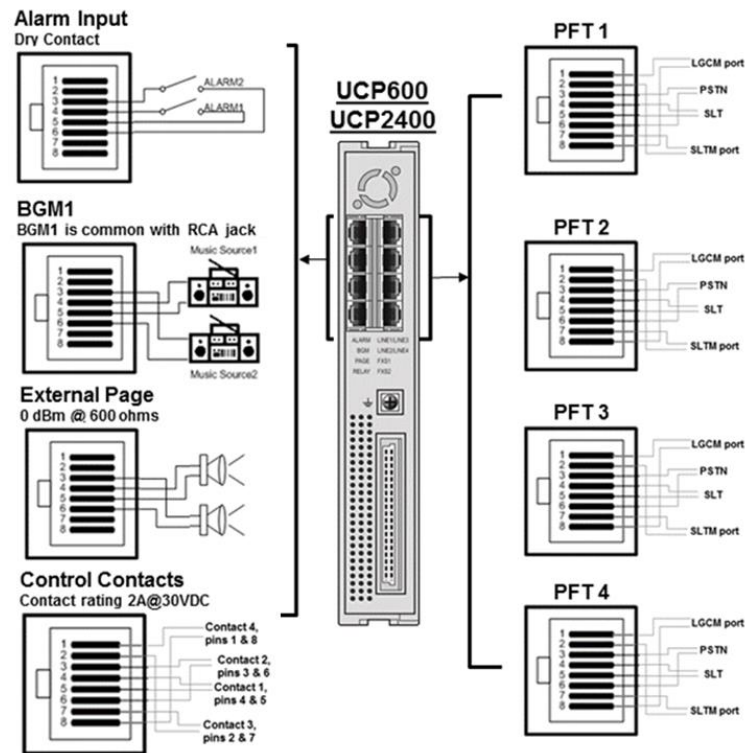
Figure 6.2-2 UCP600/2400 Miscellaneous & Power Fail Transfer Connections

<u>**AC/DC Adapter**</u>
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the UCPs Power jack.

6.2.1   Using Jack splitters

Jack splitters are provided with the Line option units and the iPECS UCP100 when an option unit is pre-installed, Figure 6.2.1-1.

The Jack Splitter can be used to gain a more direct connection to the CO/BRI lines. The splitter separates the two CO/BRI lines terminated in the RJ-45 jack so that only one CO/BRI Line is terminated to the splitter jacks.

To use the splitter, connect a standard 8-wire RJ45 terminated line cord to the main jack in the splitter and the UCP CO/BRI Line connector, then the separated CO/BRI Line ports appear in the splitter jacks as shown in the figure below.

Each CO/BRI line is terminated to a separate connector in the normal manner, on the center pair(s) of the Jack Splitter RJ45 jacks.
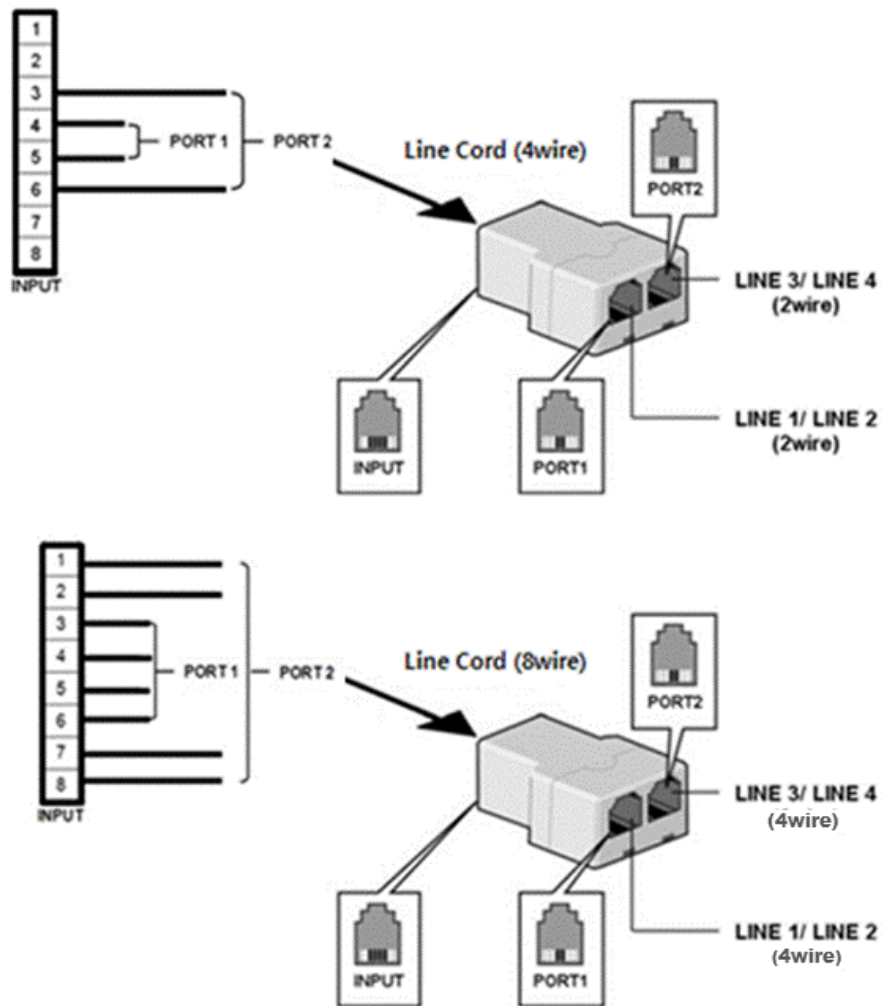
Figure 6.2.1-1 Jack Splitter Application

6.2.2   Installation of Optional PSTN Unit

A PSTN option unit (COIU4, BRIU2 and BRIU4) can be mounted on iPECS UCP100 module board.

To install PSTN option module, first remove all connections to the UCP module then perform the following steps referring to Figure 6.2.2-1:

1) Remove the UCP100 board from the module
    - Remove screws holding the housing back plate
    - Remove the screws holding the board in place
    - Carefully remove the board from the module housing

2) Locate the connector pins for the option unit.

3) Align the connectors on the option unit with the connector pins on the board and push gently to engage.

4) Carefully reinstall the board in the housing, and insert and tighten screws through the board in to the housing.

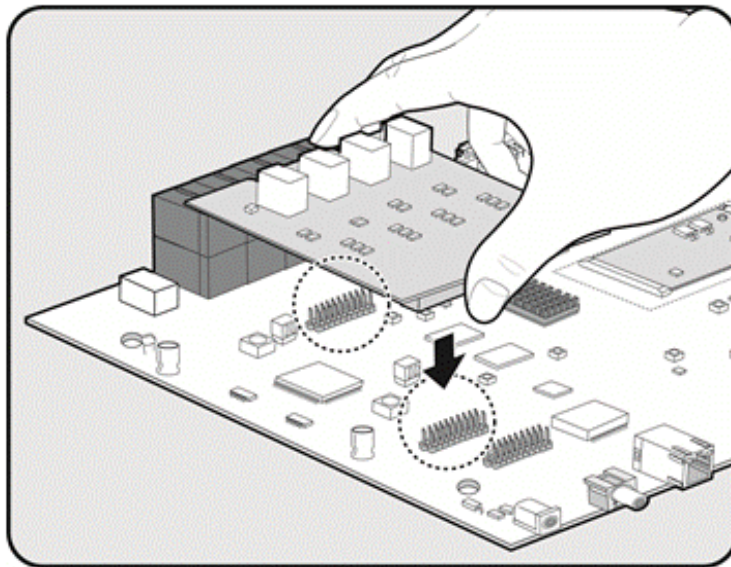5) Replace the housing back plate, and insert and tighten screws.

Figure 6.2.2-1 Option module installation

6.3   VOIM8/24 Installation

The VOIM8/24 may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder.

The VOIM8/24 is used to provide packet relay for remote devices to communicate with the host and translation between the iPECS proprietary protocols and other standard protocols (H323, SIP).

<u>**LEDs**</u>
The VOIM8 and VOIM24 have five (5) LEDs for status and diagnostic information as in Table 6.3-1.

Table 6.3-1 VOIM8 & VOIM24 Status LED Functions

LED	LED FUNCTION
S1	Trace Task active
S2	VOIM Task active
CALL	VoIP call active
S3	Registered to UCP
DSP	Transcoding in use

<u>**Wiring Connectors**</u>
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

A "WAN" RJ45 type connector is located on the front of the VOIM8/24. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7. In addition, the VOIM8/24 includes an unused "LAN" RJ-45 type connector. Currently this LAN port is not used and no connection should be made to this port.

- Wire the "WAN" connector to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

<u>**AC/DC Adapter**</u>
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.4   VCIM Installation

The VCIM may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder.

The VCIM is used to provide packet relay for remote devices to communicate with the host and translation between the iPECS proprietary protocols and other standard protocols (H323, SIP) or multi-party voice conferences.

LEDs

The VCIM have six (6) LEDs for status and diagnostic information as in Table 6.4-1.

Table 6.4-1 VCIM Status LED Functions

LED	LED FUNCTION
S1	Line Monitor
S2	VOIM Task active
S3	VoIP Channel in use
S4	Registered to UCPs
S5	Transcoding in use
S6	MCIM Task Flashing (ON – Conf. channel in use, Flashing – Idle)

Wiring Connectors

Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

A "LAN" RJ45 type connector is located on the front of the VCIM. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7. In addition, the VCIM includes an unused "LAN" RJ-45 type connector. Currently this LAN port is not used and no connection should be made to this port.

- Wire "LAN" to a 10/100/1000 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN. (LAN1 – 10/100/1000 Base-T, LAN2 – 1000 Base-T only)
- Tag or number wiring for maintenance.

AC/DC Adapter

If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.5   LGCM4 & LGCM8 Installation

The LGCM4 and LGCM8 may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The LGCM4 and LGCM8 provide a gateway between standard PSTN Loop Start Lines and other iPECS appliances. The LGCM4 can support four (4) PSTN Lines and the LGCM8 can support eight (8) PSTN Lines.

LEDs

In addition to the Power and LAN LEDs, the LGCM4 has four (4) status LEDs. and one (1) status LED. The four (4) LEDs indicate that the individual PSTN Lines are busy (LED ON), idle (LED OFF) or ringing (LED flashing). One (1) LED indicates whether a CMU is installed. If installed, the LED is ON.

In addition to the Power and LAN LEDs, the LGCM8 has eight (8) status LEDs and two (2) status LEDs. The eight (8) LEDs indicate that the individual PSTN Lines are busy (LED ON), idle (LED OFF) or ringing (LED flashing). The left and right LED indicate CMUs are installed for the 1st~4th and 5th ~ 8th ports, respectively. If installed, the LED is ON.

6.5.1   CMU (Call Metering Unit) Installation

The LGCM4 and LGCM8 support call metering with the CMU installed at the factory. Three types of regional specific modules are available CMU1216 and CMU50PR; see 3.1.4.

To install the CMU on an LGCM, first remove all connections to the LGCM module. Then, follow the instructions below referring to Figure 6.5 1 and Figure 6.5 2.

1)   Remove the LGCM board from the module
   - Remove screws holding the housing back plate
   - Remove the screws holding the board in place
   - Carefully remove the board from the module housing
2)   Locate the connector pins for the CMU.
3)   Align the connectors on the CMU with the connector pins on the board and push gently to engage.
4)   Repeat steps 2 and 3 to install the second CMU for a LGCM8, Figure 6.5 2
5)   Carefully reinstall the board in the housing, and insert and tighten screws through the board in to the housing.
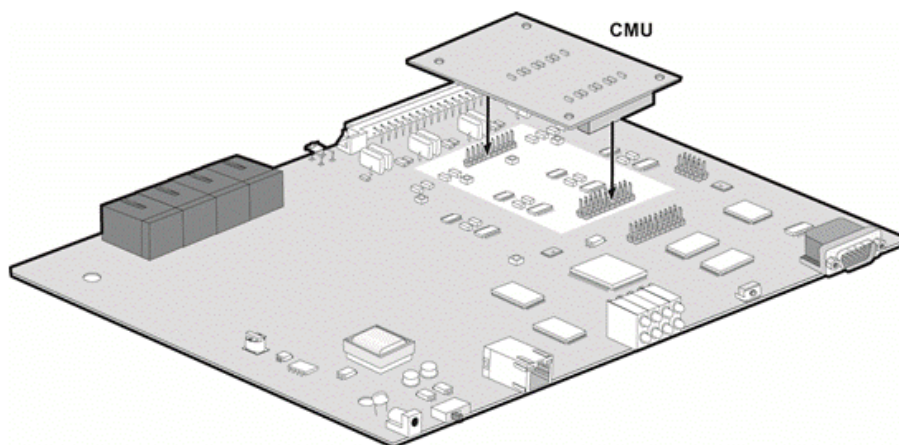6)   Replace the housing back plate, and insert and tighten screws.

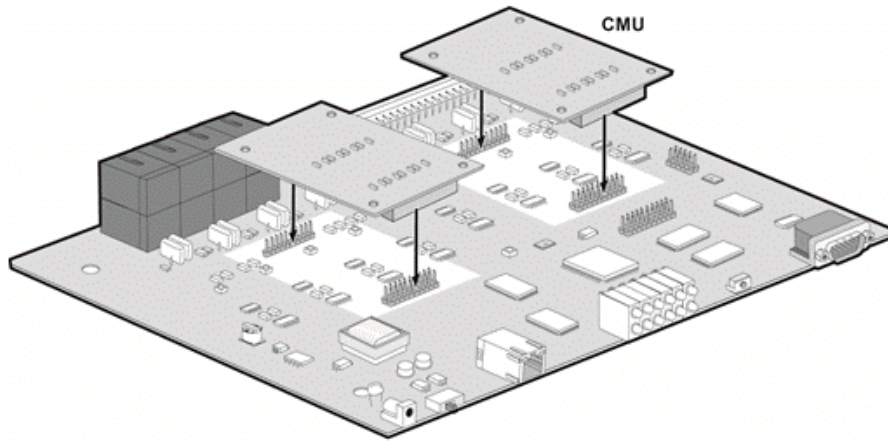**Figure 6.5-1 installing a CMU module in LGCM4**

Figure 6.5-2 Installing a CMU module with LGCM8

Wiring Connectors

Before wiring any of the Modules, connect the "⏚" screw on the back of the Module to a known protective earth ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the LGCM4 and LGCM8 is the RJ-45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

On the rear are four (4) or eight (8) RJ-45 connectors, terminated as described in 6.1.5. These connectors should be cabled to the telephone company termination point.

- Wire each RJ-45 to a CO Line at the PSTN termination point/MDF.
- Tag or number wiring for maintenance.

AC/DC Adapter

If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.6   BRIM2 Installation

The BRIM2 and BRIM4 may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The BRIM2 and BRIM4 provide a gateway between ISDN Basic Rate Interface (BRI) lines and other iPECS appliances. The BRIM2 can support two (2) BRI lines as a "T" interface and the BRIM4 can support four (4) BRI lines.

LEDs
In addition to the Power and LAN LEDs, there are four or eight LEDs, two for each BRI circuit, which provide the status information as described in Table 6.6-1.

Table 6.6-1 BRIM2 Status LED Function

LED	ON	OFF
ACT	In Use	Idle
ERR	Line Error	Normal

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the BRIM2 and BRIM4 is the RJ–45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

On the rear are two (2) or four (4) RJ-45 connectors terminated to the BRI Line interface circuits. These connectors should be wired to the telephone company termination point ("T" Mode). The connector pin assignments for the RJ-45 type jacks on the BRIM2 and BRIM4 are shown in Figure 6.6-1 and Figure 6.6-2, respectively.

- Wire each RJ-45 to a BRI line at the ISDN termination point/MDF.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

Figure 6.6-1 BRIM2 BRI Line Connector Configuration

Figure 6.6-2 BRIM4 BRI Line Connector Configuration

6.7   PRIM Installation

The PRIM Module may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The PRIM module provides a gateway for PRI line connections to other iPECS appliances.

The PRIM module can support up to 30 PCM bearer channels for European ISDN Primary Rate Interfaces or 23 PCM bearer channels for the North American Primary Rate Interface.

LEDs
In addition to the Power and LAN LEDs, the PRIM has four (4) LEDs for status and diagnostic information as in Table 6.7-1.

Table 6.7-1 PRIM Status LED Functions

LED	LED FUNCTION
LINE	Line Signal Detected
STATUS	Channels in-use
CLK SLAVE	PRIM module clock is synchronized with PRI Line
RUN	Flashing when running

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the PRIM is the RJ 45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

On the rear panel is a RJ-45 connector terminated to the PRI Line interface circuits. This connector, refer to Figure 6.7 1, should be wired to the telephone company termination point.

- Wire each RJ-45 to a PRI line at the ISDN termination point.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.
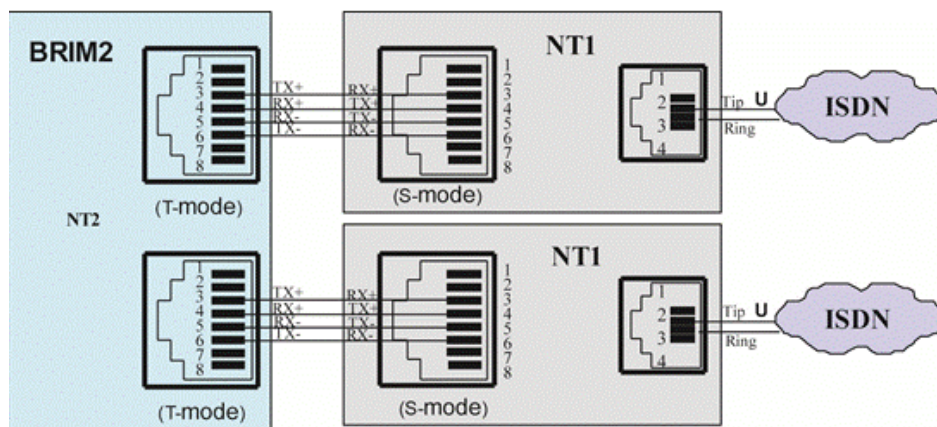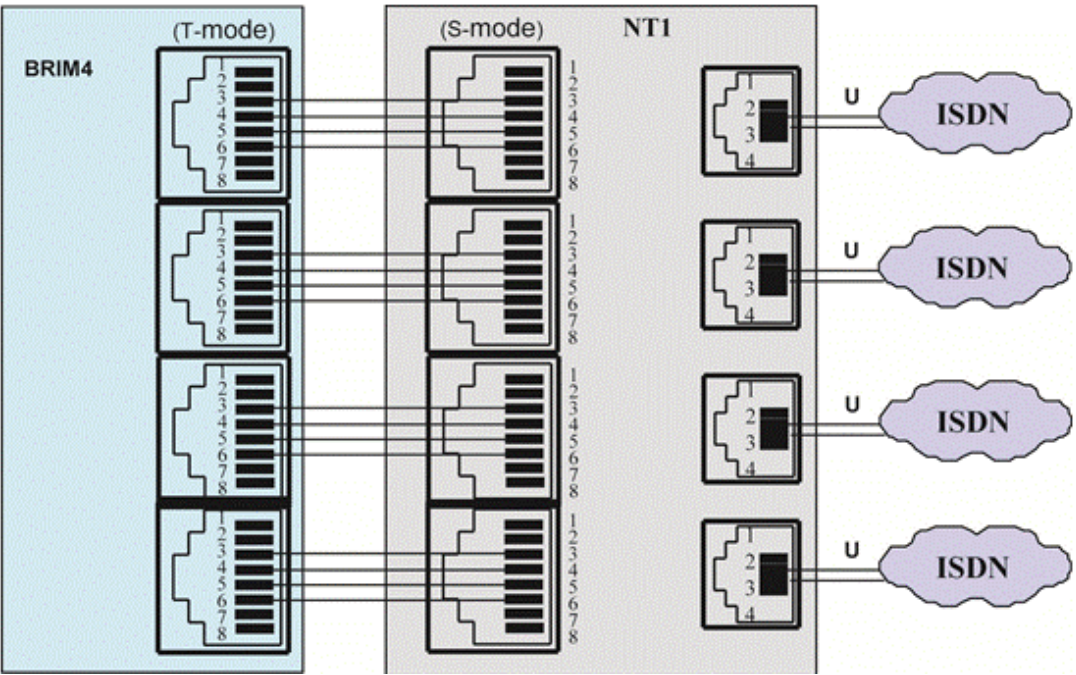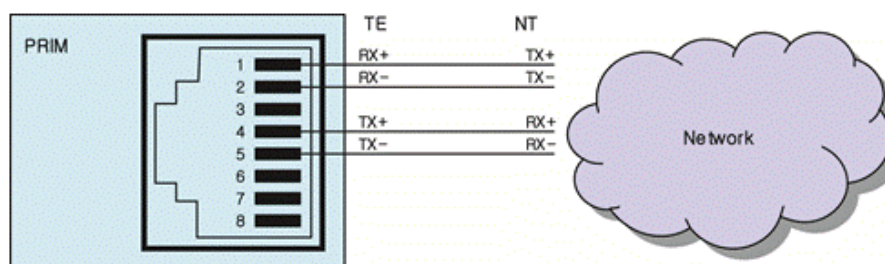

Figure 6.7-1 PRI Line Connector Configuration

6.8   DTIM8 Installation

The DTIM8 may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The DTIM8 provides a gateway between Ericsson-LG Enterprise's Digital terminals (LKD and LDP models) and other iPECS appliances. The DTIM8 can support eight (8) Digital terminals.

LEDs
In addition to the Power and LAN LEDs, the DTIM8 has eight (8) status LEDs. These LEDs indicate that the individual Digital terminals are busy (LED ON), idle (LED OFF) or ringing (LED flashing).

Wiring Connectors
Before wiring any of the Modules, connect the "⏚" screw on the back of the Module to a known protective earth ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the DTIM8 is the RJ-45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

On the rear are eight (8) RJ-45 connectors terminated as described in 6.1.5. These should be wired to the digital terminal termination point.

- Wire the RJ-45 connectors to a Digital terminal termination point/MDF.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.9   DTIM24 Installation

The DTIM24 is intended for installation in a 19" rack, **it is NOT intended for installation in the cabinet.**

The DTIM24 provides a gateway between Ericsson-LG Enterprise's Digital terminals (LKD and LDP models) and other iPECS appliances.

 To mount the DTIM24 in a 19" rack,

1)   Mount the left and right mounting brackets to the DTIM24 module using the eight (8) machine screws provided as shown in Figure 6.9-1.

2)   Mount the Module with the four (4) machine screws, nuts and washers as shown in Figure 6.9-1.

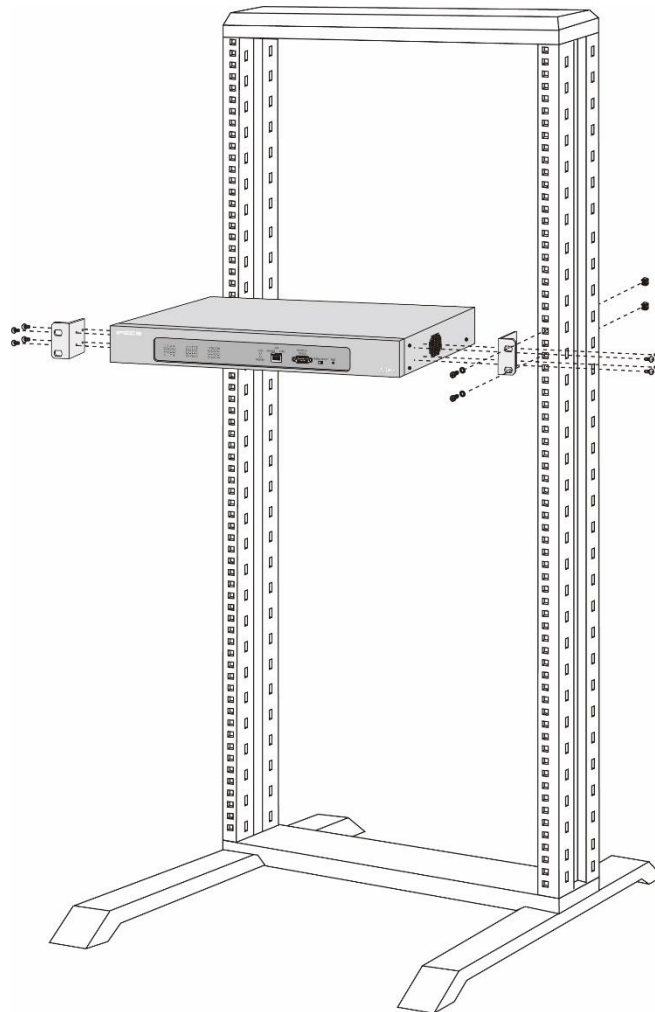3)   Complete the installation using the instructions for wiring given below.

Figure 6.9-1 DTIM24 Rack Mounting Installation

LEDs
In addition to the Power and LAN LEDs, the DTIM24 has twelve (12) dual color LEDs, which indicate that the individual Digital terminals are busy (LED ON), ringing (LED flashing) or idle (LED OFF).

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4.

On the front of the DTIM24 is the RJ 45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

On the rear is a 25-pair RJ-21x style connector terminated as shown in Figure 6.9-2. These connectors should be wired to the Digital terminal termination point as shown in the figure.

- Wire each RJ-21x to a Digital terminal termination point/MDF.
- Tag or number wiring for maintenance.

AC Power Cord
Assure the AC power cord is plugged into the power input of the DTIM24 and a live AC outlet.

Tip Port1	1	26	Ring Port1
Tip Port2	2	27	Ring Port2
Tip Port3	3	28	Ring Port3
Tip Port4	4	29	Ring Port4
Tip Port5	5	30	Ring Port5
Tip Port6	6	31	Ring Port6
Tip Port7	7	32	Ring Port7
Tip Port8	8	33	Ring Port8
Tip Port9	9	34	Ring Port9
Tip Port10	10	35	Ring Port10
Tip Port11	11	36	Ring Port11
Tip Port12	12	37	Ring Port12
Tip Port13	13	38	Ring Port13
Tip Port14	14	39	Ring Port14
Tip Port15	15	40	Ring Port15
Tip Port16	16	41	Ring Port16
Tip Port17	17	42	Ring Port17
Tip Port18	18	43	Ring Port18
Tip Port19	19	44	Ring Port19
Tip Port20	20	45	Ring Port20
Tip Port21	21	46	Ring Port21
Tip Port22	22	47	Ring Port22
Tip Port23	23	48	Ring Port23
Tip Port24	24	49	Ring Port24
Blank	25	50	Blank

Figure 6.9-2 DTIM24 RJ-21X Connector Configuration

CAUTION

Be careful not to short each other on both ends of the wires. Also be careful not to short on the ground and chassis.

6.10   SLTM4 & SLTM8 Installation

The SLTM4 and SLTM8 may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The SLTM4 provides a gateway between four (4) standard Single Line Telephone devices and other iPECS appliance and the SLTM8 provides eight (8).

LEDs
In addition to the Power and LAN LEDs, the SLTM4 has four (4) status LEDs, one (1) for each SLT port. The LEDs indicate the status of the associated SLT port in-use (LED ON), ringing (LED flashing) or idle (LED OFF).

In addition to the Power and LAN LEDs, the SLTM8 has eight (8) status LEDs, one (1) for each SLT port 1~8. The LEDs indicate the status of the associated SLT port in-use (LED ON), ringing (LED flashing) or idle (LED OFF).

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the SLTM4 and SLTM8 is the RJ 45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

On the rear are four (4) or eight (8) RJ-45 connectors terminated as described in 6.1.5, which should be wired to the SLT termination points.

- Wire each RJ-45 to an SLT device/MDF.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.11   SLTM32 Installation

The SLTM32 is intended for installation in a 19" rack, **it is NOT intended for installation in the cabinet.**

The SLTM32 provides a gateway between thirty-two (32) standard Single Line Telephone devices and other iPECS appliances.

 To mount the SLTM32 in a 19" rack,

1)   Mount the left and right mounting brackets to the SLTM32 module using the eight (8) machine screws provided as shown in Figure 6.11-1.

2)   Mount the Module in the 19" rack with the four (4) machine screws, nuts and washers as shown in Figure 6.11-1.

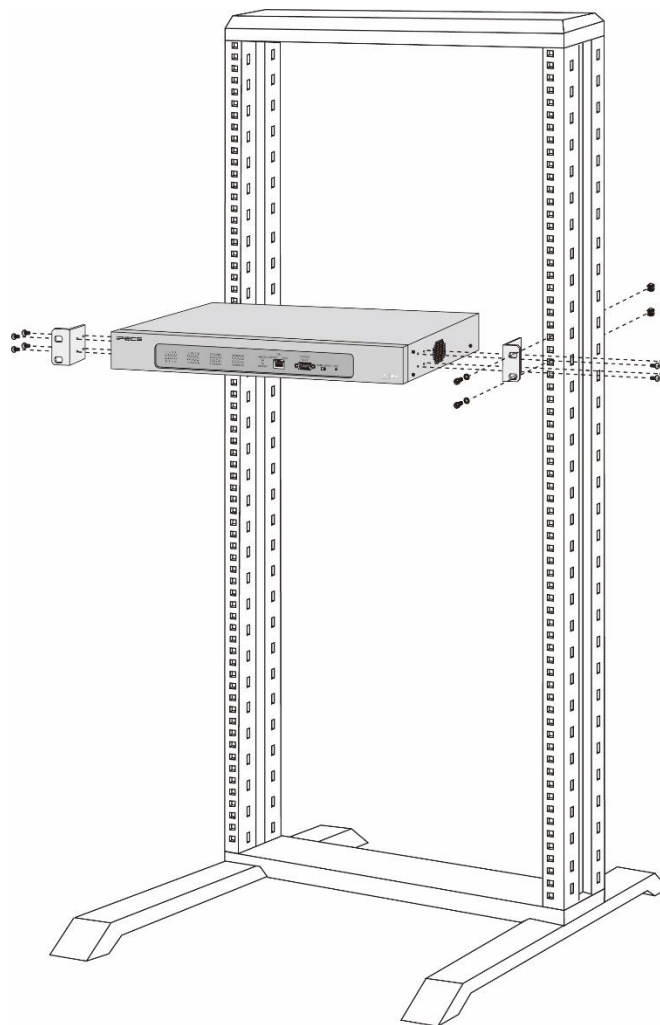3)   Complete the installation using the instructions for wiring given below.

Figure 6.11-1 SLTM32 Rack Mounting Installation

LEDs

In addition to the Power and LAN LEDs, the SLTM32 has Sixteen (16) dual color LEDs, which indicate the status of the associated SLT port: in-use (LED ON), ringing (LED flashing) or idle (LED OFF).

AC/DC Adapter

Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4.

On the front of the SLTM32 is the RJ–45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

On the rear are two (2) 25-pair RJ-21x style connectors terminated as shown in Figure 6.11-2

. These connectors should be wired to the SLT termination point as shown in the figure.

- Wire each RJ-21x to an SLT device/MDF.
- Tag or number wiring for maintenance.

AC Power Cord

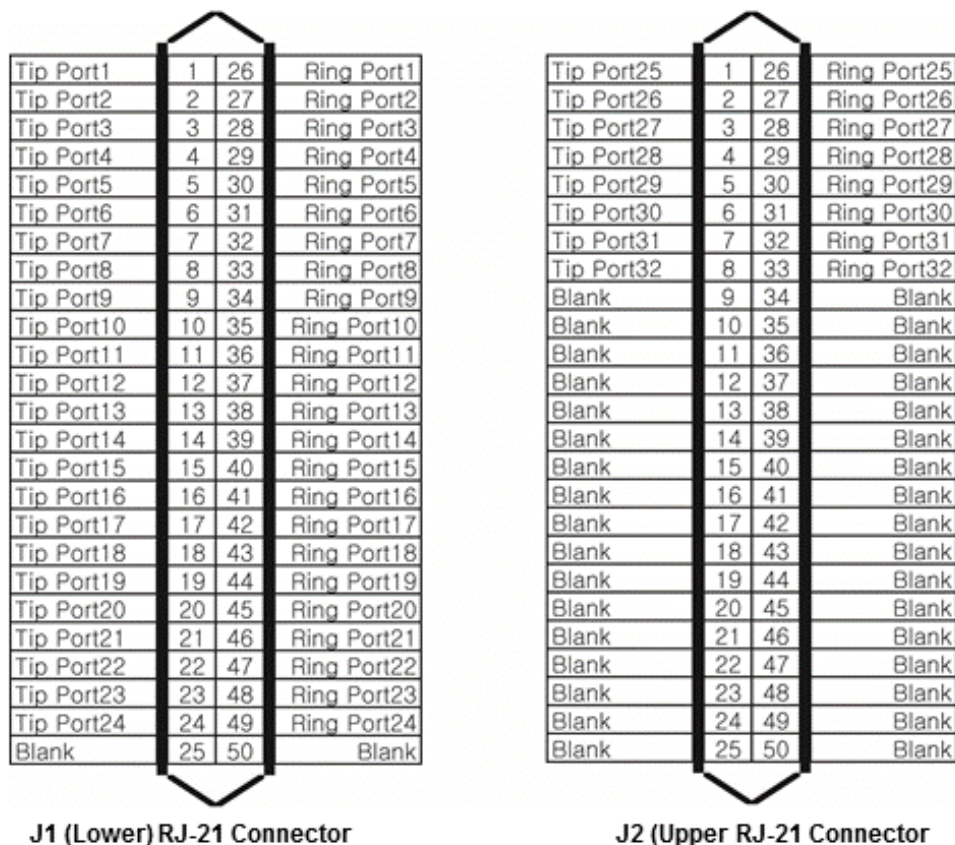Assure the AC power cord is plugged into the power input of the SLTM32 and a live AC outlet.

Tip Port1	1	26	Ring Port1
Tip Port2	2	27	Ring Port2
Tip Port3	3	28	Ring Port3
Tip Port4	4	29	Ring Port4
Tip Port5	5	30	Ring Port5
Tip Port6	6	31	Ring Port6
Tip Port7	7	32	Ring Port7
Tip Port8	8	33	Ring Port8
Tip Port9	9	34	Ring Port9
Tip Port10	10	35	Ring Port10
Tip Port11	11	36	Ring Port11
Tip Port12	12	37	Ring Port12
Tip Port13	13	38	Ring Port13
Tip Port14	14	39	Ring Port14
Tip Port15	15	40	Ring Port15
Tip Port16	16	41	Ring Port16
Tip Port17	17	42	Ring Port17
Tip Port18	18	43	Ring Port18
Tip Port19	19	44	Ring Port19
Tip Port20	20	45	Ring Port20
Tip Port21	21	46	Ring Port21
Tip Port22	22	47	Ring Port22
Tip Port23	23	48	Ring Port23
Tip Port24	24	49	Ring Port24
Blank	25	50	Blank

J1 (Lower) RJ-21 Connector

Tip Port25	1	26	Ring Port25
Tip Port26	2	27	Ring Port26
Tip Port27	3	28	Ring Port27
Tip Port28	4	29	Ring Port28
Tip Port29	5	30	Ring Port29
Tip Port30	6	31	Ring Port30
Tip Port31	7	32	Ring Port31
Tip Port32	8	33	Ring Port32
Blank	9	34	Blank
Blank	10	35	Blank
Blank	11	36	Blank
Blank	12	37	Blank
Blank	13	38	Blank
Blank	14	39	Blank
Blank	15	40	Blank
Blank	16	41	Blank
Blank	17	42	Blank
Blank	18	43	Blank
Blank	19	44	Blank
Blank	20	45	Blank
Blank	21	46	Blank
Blank	22	47	Blank
Blank	23	48	Blank
Blank	24	49	Blank
Blank	25	50	Blank

J2 (Upper RJ-21 Connector

Figure 6.11-2 SLTM32 RJ-21X Connector Configuration

6.12   UVM Installation

The UVM may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder.

The UVM module provides voice storage and processing for Automated Attendant and Voice Mail capabilities as well as other Voice Processing features.

The UVM module supports eight (8) channels with 50 hours of storage and expands to 16 channels with up to 200 hours of storage by installing appropriate licenses.

LEDs
In addition to the Power and LAN LEDs, the UVM has six (6) LEDs for status and diagnostics information as shown in Table 6.12-1.

Table 6.12-1 UVM Status LED Functions

LED	LED Function
RECORD	Voice mail Record active
PLAY	Voice mail Play back active
MEM FULL	Memory full
S1	CPU alive (Flashing)
S2	Reserved
S3	Reserved

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the UVM is the RJ 45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100/1000 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.13   MCIM Installation

The MCIM may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder.

The MCIM performs the various conference functions for multi-party voice conferences. With the MCIM, iPECS terminals can establish voice conferences with up to 32 parties using the g.711 or g.729 codec or 24 parties with the g.723 codec.

LEDs
In addition to the Power and LAN LEDs, the MCIM has four (4) LEDs for status information as shown in Table 6.13-1.

Table 6.13-1 MCIM Status LED Functions

LED	LED Function
Voice Conf	Voice Conference Active
S1	Reserved
S2	Reserved
S3	CPU alive (Flashing)

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the MCIM is the RJ 45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.14   ES8GP Installation

The ES8GP may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The ES8GP is employed to connect LIP Phones, standard VoIP phones and other iPECS Modules to the LAN.

The ES8GP has eight (8) switched 10/100/1000 Base-T Ethernet ports and an "UPLINK" port. When DC power is supplied in accordance with IEEE 802.3af by an ES8GP port, the associated "PORT PWR STATUS" LED is ON.

LEDs
The ES8GP has a Power LED and LAN connector LEDs. Each LAN connector has a green LED indicating Link and activity and a yellow LED indicating Link speed (ON for 1000Mbs, OFF for 10/100Mbs).

Remote Power Switch & "PORT PWR STATUS" LEDs
Each switch port of the ES8GP, except the "UPLINK" port can provide 48VDC feed over the LAN employing pin pairs 3 & 6 (-) and 1 & 2 (+) of the RJ-45 connector. For the ES8GP, detection and power feed are done automatically and the power feed status of each port is displayed through the "PORT PWR STATUS" LEDs.

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the ES8GP are the "UPLINK" and eight (8) switched port "1X~8X" connectors, each an RJ–45 type. These connectors should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7. If cascading is necessary, refer to 6.1.7.

- Wire the "UPLINK" port to the corporate LAN router or switch, an ES8GP can be used to connect to the LAN.
- Wire each LAN port to an RJ-45 wall/floor jack for an LIP Phone or VoIP terminal location, or to the "LAN" port of another iPECS device.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.15   ES8G Installation

The ES8G may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The ES8G is employed to connect LIP Phones, standard VoIP phones and other iPECS Modules to the LAN.

The ES8G has eight (8) switched 10/100/1000 Base-T Ethernet ports and an "UPLINK".

LEDs
The ES8G has a Power LED and LAN connector LEDs. Each LAN connector has a green LED indicating Link and activity and a yellow LED indicating Link speed (ON for 1000Mbs, OFF for 10/100Mbs).

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded.

On the front of the ES8G are the "UPLINK" and eight (8) switch port "1X~8X" connectors, each an RJ–45 type. These connectors should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7. If cascading is necessary, refer to 6.1.7.

- Wire the "UPLINK" port to the corporate LAN router or switch, an ES8G can be used to connect to the LAN.
- Wire each "LAN" port to an RJ-45 wall/floor jack for an LIP Phone or VoIP terminal location, or to the "LAN" port of another iPECS device.
- Tag or number wiring for maintenance.

AC/DC Adapter
If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.16   WTIM4/8 Installation

A WTIM4 or WTIM8 may be installed anywhere except for slot 10 of the cabinet, or may be installed anywhere in the Desk Mount Holder. The WTIM4/8 is connected to the GDC-600BE System DECT Base Station, which provides the RF link between DECT handsets such as GDC-450H/480H/500H and other iPECS appliances.

The WTIM4 can provide up to four (4) GDC-600BE interfaces. The WTIM8 can provide up to eight (8) GDC-600BE interfaces. Detailed instructions on configuration and installation of WTIMs and Base Stations (GDC-600BE) are provided in the System DECT Installation Manual. The following information is provided for reference only.

LEDs
In addition to the Power and LAN LEDs, the WTIM4/8 has eight (8) status LEDs. The definition of LEDs is shown in Table 6.16-1 below.

Table 6.16-1 WTIM4/8 Status LED Functions

| LED	LED FUNCTION
CP1	Main CPU is normal, LED flashes.
CP2	Sub CPU is normal, LED flashes.
WBUS	WTIM communicating with another WTIM, LED flashes.
USE	Two or more DECT channel(s) in use, LED ON.
LINK	WTIM connected to UCP via LAN, LED ON.
HBUS	WTIM communicating with UCP, LED flashes.
E1	WTIM communicating with Base Station (GDC-400B), LED flashes.
M/S	Main WTIM, LED is turned ON., Sub-WTIM, LED is turned OFF.

MODE Switch & Settings
Each WTIM has a four (4) position DIP-switch. The function of each switch position is given in Table 6.16-2.

Table 6.16-2 WTIM4/8 Mode Switch Functions

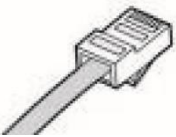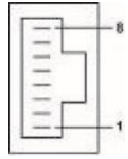| SWITCH	FUNCTION	ON	OFF	DEFAULT
1	Reserved	TBR6 test mode	Normal	OFF
2	Echo-canceller control when CRC error at 600BE	Enable (Enable mute Function)	Disable (Disable mute Function)	ON
3	Serial selection	Sub CPU Serial mode	Main CPU Serial mode	ON
4	S/W debugging	All base reset	One base reset	OFF

Wiring Connectors
Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4. If installed in a cabinet assure the cabinet is grounded. On the front of the WTIM is the RJ–45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8GP/ES8G can be used to connect to the LAN.
- Tag or number wiring for maintenance.

The RJ-45 connectors on the rear of the WTIM are used to connect to the Base Stations. This wiring is detailed in the System DECT Installation Manual. The pin assignments given in Table 6.16-3 below are provided for reference only.

Table 6.16-3 WTIM4/8 Pin assignments

Connector	Pin Number	NO	SIGNAL NAME	FUNCTION
RJ-45		1, 2, 7, 8	RESERVED	
		3	RX+	Receive Data
		4	TX-	Transmit Data
		5	TX+	Transmit Data
		6	RX-	Receive Data

Multiple WTIM connection

When multiple WTIMs are installed and handover between Base Stations (GDC-600BEs) is required, the WTIMs must be interconnected. Up to three (3) WTIMs may be interconnected to allow handover between the connected Base Stations. Wiring for this connection is shown in Figure 6.16-1 below. The WTIM interconnection is a separate connection not provided by the back panel, thus, even when the WTIMs are installed in a cabinet the interconnection of the WTIMs is required.

On the front of the WTIM are the RJ–45 type Sync Cable In and Sync Cable Out connectors. These connectors should be wired to the appropriate Sync Cable In/Out connector of the next WTIM as discussed above. Note that power must be removed prior to connecting the Sync Cable between WTIMs.

- Wire "Sync Cable Out" directly to the "Sync Cable In" of the next WTIM as shown in Figure 6.16-1 below.
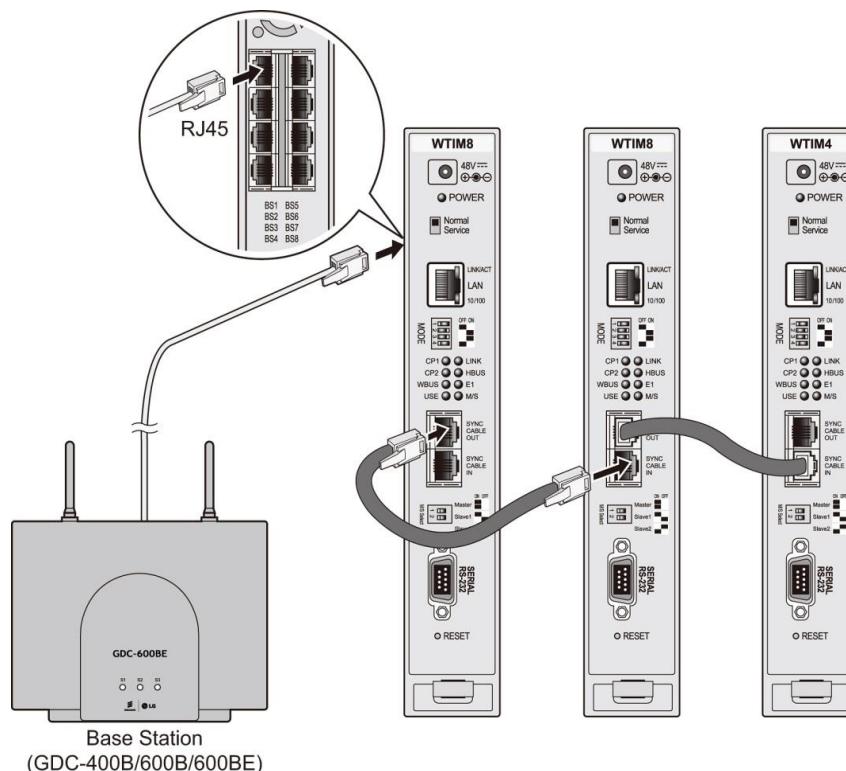- Tag or number wiring for maintenance.

Figure 6.16-1 Cascading connections of WTIM4/8

AC/DC Adapter

If a PSU is not employed, assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

6.17   WTIM24 Installation

The WTIM24 is intended for installation in a 19" rack**, it is NOT intended for installation in the cabinet.** The WTIM24 provides twenty-four (24) DECT base stations (GDC-600BE) interfaces for DECT handset registration.

To mount the WTIM24 in a 19" rack,

1)   Mount the left and right mounting brackets to the WTIM24 module using the eight (8) machine screws provided as shown in figure 6.17-1.

2)   Mount the Module in the 19" rack with the four (4) machine screws, nuts and washers as shown in figure 6.17-1.

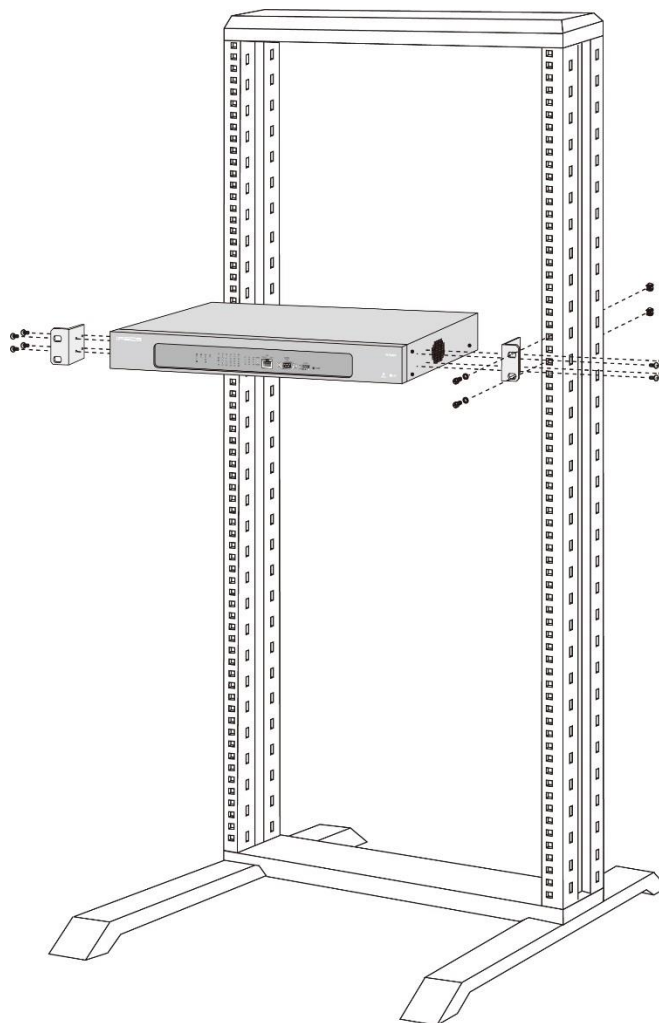3)   Complete the installation using the instructions for wiring given below.

**Figure 6.17-1 WTIM24 Rack Mounting Installation**

LEDs

In addition to the Power and LAN LEDs, the WTIM24 has Twelve (12) dual color LEDs, which indicate the status of the DECT base connection.

Furthermore, the WTIM24 has Six (6) blue color LEDs for system operation indication. Additional Six (6) blue color LEDs are supported to check the multiple WTIM connection.

Table 6.17-1 WTIM24 Status LED Functions

Silk Name	Color	Function	Description
PWR1	Pure Green	Power Indication	+5V Indication
PWR2			+30V Indication
S1	Blue	Status LEDs for WTIM24	LINK (WTIM24 connected to UCP via LAN, LED ON)
S2			BASE (WTIM24 communicating with Base Station, LED flashes)
S3			CPU (NIOS II CPU is normal, LED flashes)
S4			UCP(WTIM24 communicating with UCP, LED flashes)
S5			WITM(WTIM24 communicating with another WTIM24, LED flashes)
S6			MODE (Master-ON, Slave 1-Toggle, Slave2-OFF)
1, 13	Bi-color (Blue/Yellow)	Status LEDs for DECT Base	ON (Connected), OFF (not connected)
2, 14			
3, 15			
4, 16			
5, 17			
6, 18			
7, 19			
8, 20			
9, 21			
10, 22			
11, 23			
12, 24			
L1~L6	Blue	Master/Slave Connection Status	L1~L3 (Master-Slave 1 connection), L4~L6 (Master-Slave2 connection). ON (Connected and Normal), OFF (not connected or Abnormal)
F-ERR	Red	FAN Fault	ON (Fault), OFF (Normal)
LINK/ACT, 10/100	Left-Green Right-Orange	LAN Status	Left-Link/Act, Right- Speed (10/100Mbps)

LAN and Power Connection

Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground, refer to 6.1.4.

On the front of the WTIM24 is the RJ–45 type "LAN" connector. This connector should be wired to the appropriate LAN points as discussed in 6.1.6 and 6.1.7.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.

- Tag or number wiring for maintenance.

Assure the AC power cord is plugged into the power input of the WTIM24 and a live AC outlet.

MODE Switch & Settings

Each WTIM24 has a four (4) position DIP-switch. The function of each switch position is given in table 6.17-2 below.

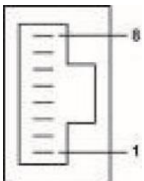**Table 6.17-2 WTIM24 Mode Switch Functions**

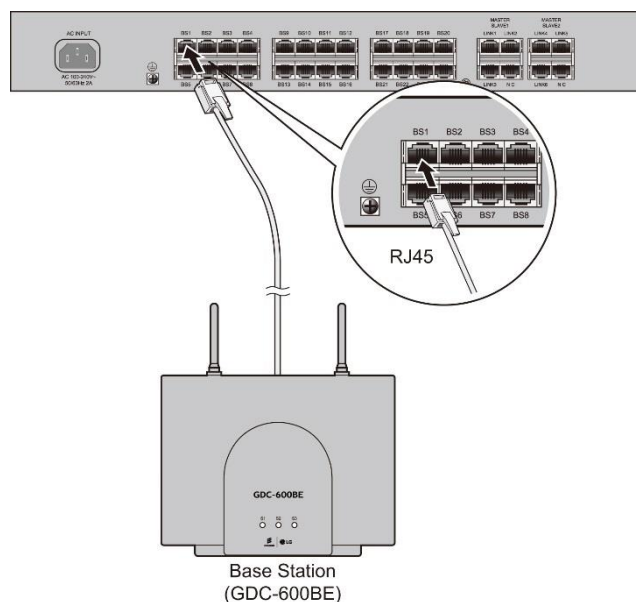| SWITCH	FUNCTION	ON	OFF	DEFAULT
1	TBR6 Test	TBR6 test mode	Normal	OFF
2	Serial selection	Sub CPU Serial mode	Main CPU Serial mode	OFF
3	Mode Selection 0	Pole 4/ Pole 3		ON
4	Mode Selection 1	(00 – Master, 01 – Slave 1, 10 – Slave 2)		ON

- Master mode: Pole 1 ~ Pole 4 (OFF/ OFF/ ON/ ON)

- Slave 1 mode: Pole 1 ~ Pole 4 (OFF/ OFF/ OFF/ ON)

- Slave 2 mode: Pole 1 ~ Pole 4 (OFF/ OFF/ ON/ OFF)

Wiring Connectors

The RJ-45 connectors on the rear of the WTIM24 are used to connect to the Base Stations. This wiring is detailed in the System DECT Installation Manual. The pin assignments given in table 6.17-3 below are provided for reference only.

Table 6.17-3 WTIM24 Pin assignments for DECT Base Station

Connector	Pin Number	No.	Signal Name	Function
RJ-45		1, 2, 7, 8	RESERVED	
		3	RX+	Receive Data
		4	TX-	Transmit Data
		5	TX+	Transmit Data
		6	RX-	Receive Data

Base Station
(GDC-600BE)

Multiple WTIM connection

When multiple WTIMs are installed and handover between Base Stations (GDC-600BEs) is required, the WTIMs must be interconnected.

Up to three (3) WTIMs may be interconnected to allow handover between the connected Base Stations. Wiring for this connection is shown in figure 6.17-2 below.

The WTIM interconnection is a separate connection not provided by the back panel, thus, even when the WTIMs are installed in a cabinet the interconnection of the WTIMs is required.

On the rear side of the WTIM are the RJ–45 type female connectors. These connectors should be wired to the next slave WTIM from master WTIM using RJ-45 cross cable as shown in Figure.

- Wire "LINK1" directly to the "LINK1" of the next WTIM (Slave 1)
- Wire "LINK2" directly to the "LINK2" of the next WTIM (Slave 1)
- Wire "LINK3" directly to the "LINK3" of the next WTIM (Slave 1)
- Wire "LINK4" directly to the "LINK1" of the next WTIM (Slave 2)
- Wire "LINK5" directly to the "LINK2" of the next WTIM (Slave 2)
- Wire "LINK6" directly to the "LINK3" of the next WTIM (Slave 2)
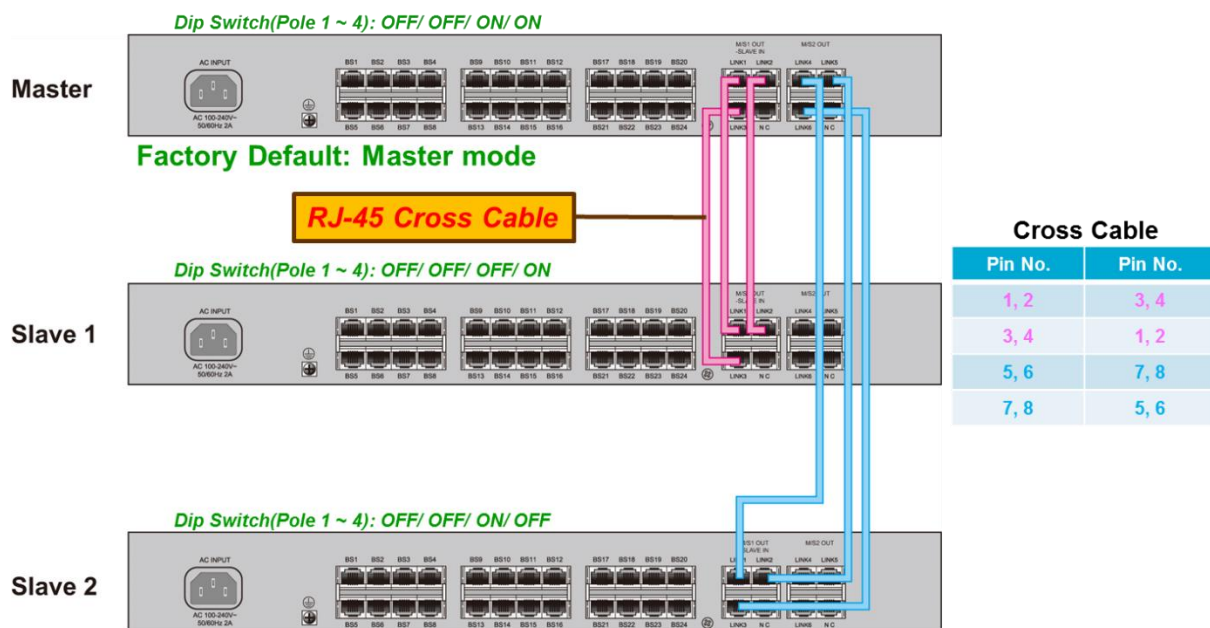- Tag or number wiring for maintenance.

Figure 6.17-2 Multiple connections of WTIM24

Remark: RJ-45 Cross cable must be connected between master and slave system

The detailed connection diagram given in figure 6.17-3 below are provided for reference only.
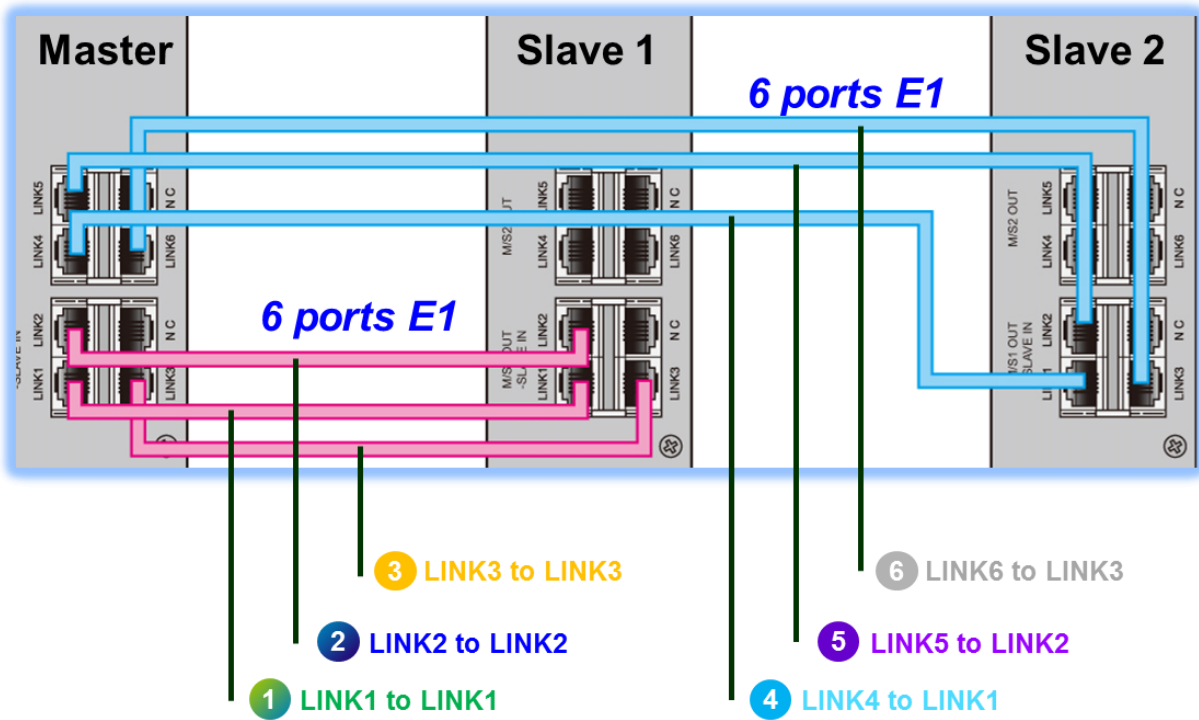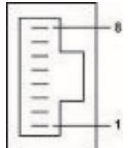

Figure 6.17-3 Detailed connections for WBUS

The pin assignments given in Table 6.17-4 below are provided for RJ-45 cross cable.

Table 6.17-4 RJ-45 cross cable Pin assignments for WBUS

Connector	Pin Number	Connection	Pin No.	Pin No.
RJ-45		2 E1 Interface Cross Connection	1, 2	3, 4
			3, 4	1, 2
			5, 6	7, 8
			7, 8	5, 6

6.18   Main Cabinet Wiring

With the Enhanced Main Cabinet, telephony connections (PSTN, ISDN, SLT, and DTIM) are through male RJ-21X 25-pair connectors mounted on the back panel. Modules terminate the telephony interfaces at the appropriate connector on the back plane. The relationship between slots and RJ-21X connectors is shown in Figure 6.18-1.

Note the, WTIM4 and WTIM8 terminate directly to the DECT Base Stations and do not terminate in the male RJ-21X connectors of the Main Cabinet.

Complete all the telephony wiring for the Module prior to installing and applying power to the Module. Note also consider the slot and sequence assignments when installing Modules, refer to 6.1.1.

Complete all telephony wiring by making cross-connects between the RJ-21X and the appropriate telephone company termination point. For details, see Table 6.17-1. For the PRIM only Port 1 is connected, and for the BRIM2 and BRIU2 only Port 1 and Port 2 are connected.
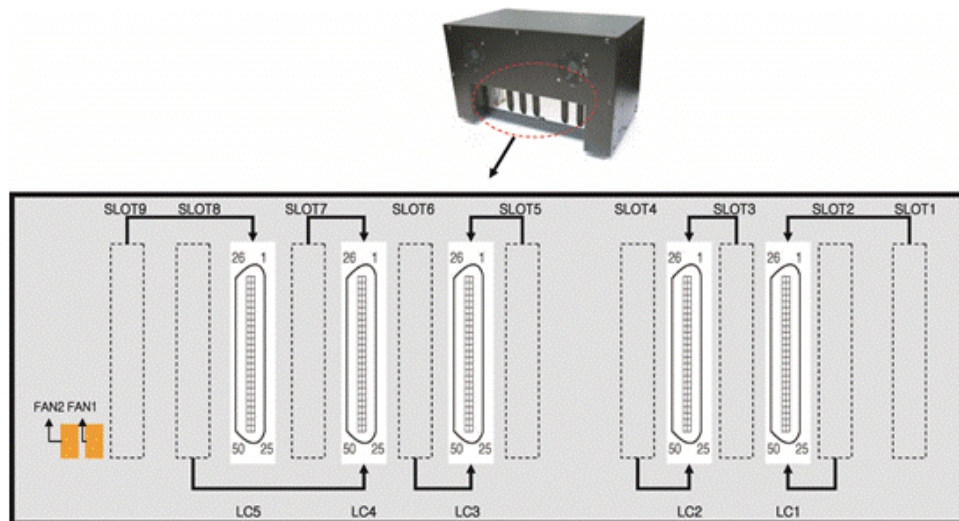

Figure 6.18-1 RJ-21x Connector Backplane Wiring Diagram

Table 6.18-1 Main Cabinet Back Panel LC Connector Pin Assignment

Back panel connector & Slot	RJ-21		Module Type				
	Pair	Pin	LGCM8 DTIM8 SLTM8	LGCM4 SLTM4	BRIM4 PRIM	UCP100 COIU4	UCP100 BRIU2/4
	1	1	Port 1-Tip	n/c	Port 1 TX+	Port 1-Tip	Port 1 Rx+
		26	Port 1-Ring	n/c	Port 1 TX-	Port 1-Ring	Port 1 RX-
	2	2	Port 2-Tip	n/c	Port 1 RX+	Port 2-Tip	Port 2 Rx+
		27	Port 2-Ring	n/c	Port 1 RX-	Port 2-Ring	Port 2 RX-
	3	3	Port 3-Tip	n/c	Port 2 TX+	Port 3-Tip	Port 1 Tx+
		28	Port 3-Ring	n/c	Port 2 TX-	Port 3-Ring	Port 1 TX-
	4	4	Port 4-Tip	n/c	Port 2 RX+	Port 4-Tip	Port 2 Tx+
		29	Port 4-Ring	n/c	Port 2 RX-	Port 4-Ring	Port 2 TX-
	5	5	n/c	n/c	n/c	n/c	n/c
		30	n/c	n/c	n/c	n/c	n/c
	6	6	n/c	n/c	n/c	n/c	n/c
		31	n/c	n/c	n/c	n/c	n/c
	7	7	Port 5-Tip	Port 1-Tip	Port 3 TX+	n/c	Port 3 Rx+
		32	Port 5-Ring	Port 1-Ring	Port 3 TX-	n/c	Port 3 RX-
LC1 Slot 1	8	8	Port 6-Tip	Port 2-Tip	Port 3 RX+	n/c	Port 4 Rx+
LC2 Slot 3		33	Port 6-Ring	Port 2-Ring	Port 3 RX-	n/c	Port 4 RX-
LC3 Slot 5	9	9	Port 7-Tip	Port 3-Tip	Port 4 TX+	n/c	Port 3 Tx+
LC4 Slot 7		34	Port 7-Ring	Port 3-Ring	Port 4 TX-	n/c	Port 3 TX-
LC5 Slot 9	10	10	Port 8-Tip	Port 4-Tip	Port 4 RX+	n/c	Port 4 Tx+
		35	Port 8-Ring	Port 4-Ring	Port 4 RX-	n/c	Port 4 TX-
	11	11	n/c	n/c	n/c	n/c	n/c
		36	n/c	n/c	n/c	n/c	n/c
	12	12	n/c	n/c	n/c	n/c	n/c
		37	n/c	n/c	n/c	n/c	n/c

Table 6.18-1 Main Cabinet Back Panel LC Connector Pin Assignment

Back panel connector & Slot	RJ-21		Module Type				
	Pair	Pin	LGCM8 DTIM8 SLTM8	LGCM4 SLTM4	BRIM4 PRIM	UCP100 COIU4	UCP100 BRIU2/4
	13	13	Port 1-Tip	n/c	Port 1 TX+	Port 1-Tip	Port 1 Rx+
		38	Port 1-Ring	n/c	Port 1 TX-	Port 1-Ring	Port 1 RX-
	14	14	Port 2-Tip	n/c	Port 1 RX+	Port 2-Tip	Port 2 Rx+
		39	Port 2-Ring	n/c	Port 1 RX-	Port 2-Ring	Port 2 RX-
	15	15	Port 3-Tip	n/c	Port 2 TX+	Port 3-Tip	Port 1 Tx+
		40	Port 3-Ring	n/c	Port 2 TX-	Port 3-Ring	Port 1 TX-
	16	16	Port 4-Tip	n/c	Port 2 RX+	Port 4-Tip	Port 2 Tx+
		41	Port 4-Ring	n/c	Port 2 RX-	Port 4-Ring	Port 2 TX-
	17	17	n/c	n/c	n/c	n/c	n/c
		42	n/c	n/c	n/c	n/c	n/c
	18	18	n/c	n/c	n/c	n/c	n/c
		43	n/c	n/c	n/c	n/c	n/c
	19	19	Port 5-Tip	Port 1-Tip	Port 3 TX+	n/c	Port 3 Rx+
		44	Port 5-Ring	Port 1-Ring	Port 3 TX-	n/c	Port 3 RX-
	20	20	Port 6-Tip	Port 2-Tip	Port 3 RX+	n/c	Port 4 Rx+
		45	Port 6-Ring	Port 2-Ring	Port 3 RX-	n/c	Port 4 RX-
LC1 Slot 2 LC2 Slot 4 LC3 Slot 6 LC4 Slot 8	21	21	Port 7-Tip	Port 3-Tip	Port 4 TX+	n/c	Port 3 Tx+
		46	Port 7-Ring	Port 3-Ring	Port 4 TX-	n/c	Port 3 TX-
	22	22	Port 8-Tip	Port 4-Tip	Port 4 RX+	n/c	Port 4 Tx+
		47	Port 8-Ring	Port 4-Ring	Port 4 RX-	n/c	Port 4 TX-
	23	23	n/c	n/c	n/c	n/c	n/c
		48	n/c	n/c	n/c	n/c	n/c
	24	24	n/c	n/c	n/c	n/c	n/c
		49	n/c	n/c	n/c	n/c	n/c
	25	25	Tel Ground	Tel Ground	Tel Ground	Tel Ground	Tel Ground
		50	Tel Ground	Tel Ground	Tel Ground	Tel Ground	Tel Ground

7   Terminal Installation and Wiring

7.1   IP Phone & DSS Installation

LIP Phones and Consoles can be connected to any standard 10/100/1000 Base-T Ethernet switch port.

When connected to an 802.3af compliant switch port, such as the ES8GP, the LIP Phone can derive power from the Ethernet port. When LAN power is not available, the optional AC/DC adaptor must be used.

Power
All LIP Phones consoles can be powered by the AC/DC Adapter-K- (48 VDC @0.1A) or over the LAN cable using the ES8GP or other 802.3af compliant switch.

Note the LIP-8000 series 12-button consoles are powered by the associated LIP-8000 series IP phone while the 48 button must be powered by an AC/DC Adapter-K. A maximum of two (2) 12-button consoles may be powered by the LIP Phone.

Using the AC/DC Adapter, after connecting the Phone to the LAN, the Adapter's DC voltage plug is inserted into the power-input jack in the base of the Phone.

One end of the AC power cord is inserted into the mating receptacle of the AC Adapter; the other end is inserted into the AC power outlet.
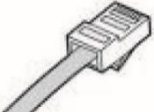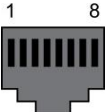
7.1.1   LIP Phone Wiring

iPECS UCP supports LIP Phone series. LIP-7008D and LIP-8004D have a single LAN port that is wired to an Ethernet switch port. Generally all other LIP phone series shown here have two (2) Ethernet ports, a LAN port and a PC port.

The LAN port is connected to an Ethernet switch port and the PC port is connected to the LAN connection of a PC. The LIP phones are wired to any 10/100/1000 Base-T Ethernet switch port with access to the iPECS UCP. The LIP phones can be powered from a PoE compatible Ethernet switch port or using the AC/DC Adaptor-K.

Modular Jack Pin Assignment

Table 7.1.1-1 LIP Phone Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45	1 8	4,5,7,8	Reserved	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

1)   Using the above wiring chart, wire the RX and TX pins from the RJ45 Wall outlet, or equal, for the IP Phone to the appropriate Ethernet switch termination point using Cat 5 or, for 1000 Base-T Cat 5e UTP cable. The maximum wire length between the IP Phone and the Ethernet switch port is 100 meters or 328 feet.

2)   Use the RJ45 terminated cable provided with the phone to connect the IP Phone LAN port to the Wall outlet.

3)   Connect the PC port to a PC LAN port using a CAT 5 or 5e cable terminated on each end with an RJ45 connector.

4)   If not using a PoE switch port, connect the DC connector of an AC Adaptor-K to the DC input on the bottom of the IP Phone and plug the AC plug of the AC adaptor in to a 100-240 VAC outlet.

Once the LIP phone powers up, it will attempt to register with the iPECS UCP. From default, the LIP phone should complete the registration successfully.

If not, the phone will display the "No Response" message shown below.

    NO RESPONSE FROM MFIM [L]
    SET[*] – RETRY[#]

This indicates the LIP phone needs to be configured for the local network environment.

To configure the phone, perform the following steps.

1)   Press '*' to set the network configuration.

2)   Enter the password, 147*.

3)   Use the Volume Up/Down buttons to scroll through the menu shown below.

4)   Enter appropriate values for the local network.

5)   When complete, press the Speaker button.

6)   Press '*' to exit and restart the LIP Phone.

Menu Display	Description
MODE[R/L] [LOCAL] – CHANGE[#]	Registration mode, use '#' to set Remote mode
PHONE IP ADDRESS (DOT:*)	Use the dial pad to enter the fixed IP address, use DHCP for dynamic addressing
PHONE NET MASK(DOT:*)	Use the dial pad to enter the Subnet mask if using fixed IP addressing
ROUTER IP ADDRESS(DOT:*)	Use the dial pad to enter the default Gateway if using fixed IP addressing
UCP IP ADDRESS(DOT:*)	Use the dial pad to enter the IP address of the UCP IP address.
SAME LAN WITH UCP [YES] – CHANGE[#]	Indicates if the IP Phone and the iPECS UCP are on the same LAN segment. Use # to change, Yes/No.
INPUT DEVICE NUMBER:	
DHCP ? [DISABLED] – CHANGE[#]	The IP Phone supports fixed or dynamic addressing, use # to change the value.
VLAN CONFIGURATION NOT SET	Not used
WEB PASSWORD	Not used
PHY MODE : AUTO NEGO CHANGE[*] SAVE[#]	Speed and Duplex negotiation, use * to change the selection

7.1.2   LIP-8000 Console Installation

LIP-8000/8000E Series Serial DSS/BLF Consoles are available in three (3) models 12-button w/paper labels (LIP-8012DSS), 12-button w/LCD (LIP-8012LSS), and 48-button w/paper labels (LIP-8048DSS).

Up to four (4) consoles can be connected to an LIP-8000 series phone using the serial ribbon cable from the console.

LIP-8000/8000E phones will power a maximum two (2) LCD DSS Consoles and, when more than two consoles are connected, one must be the 48-button Console. In all cases, the 48-button Console must be powered by the AC/DC Adaptor-K.

The figures below depict installation of various console configurations. Note that in all cases, AC/DC Adaptor-K must be attached to the 48-button Console.
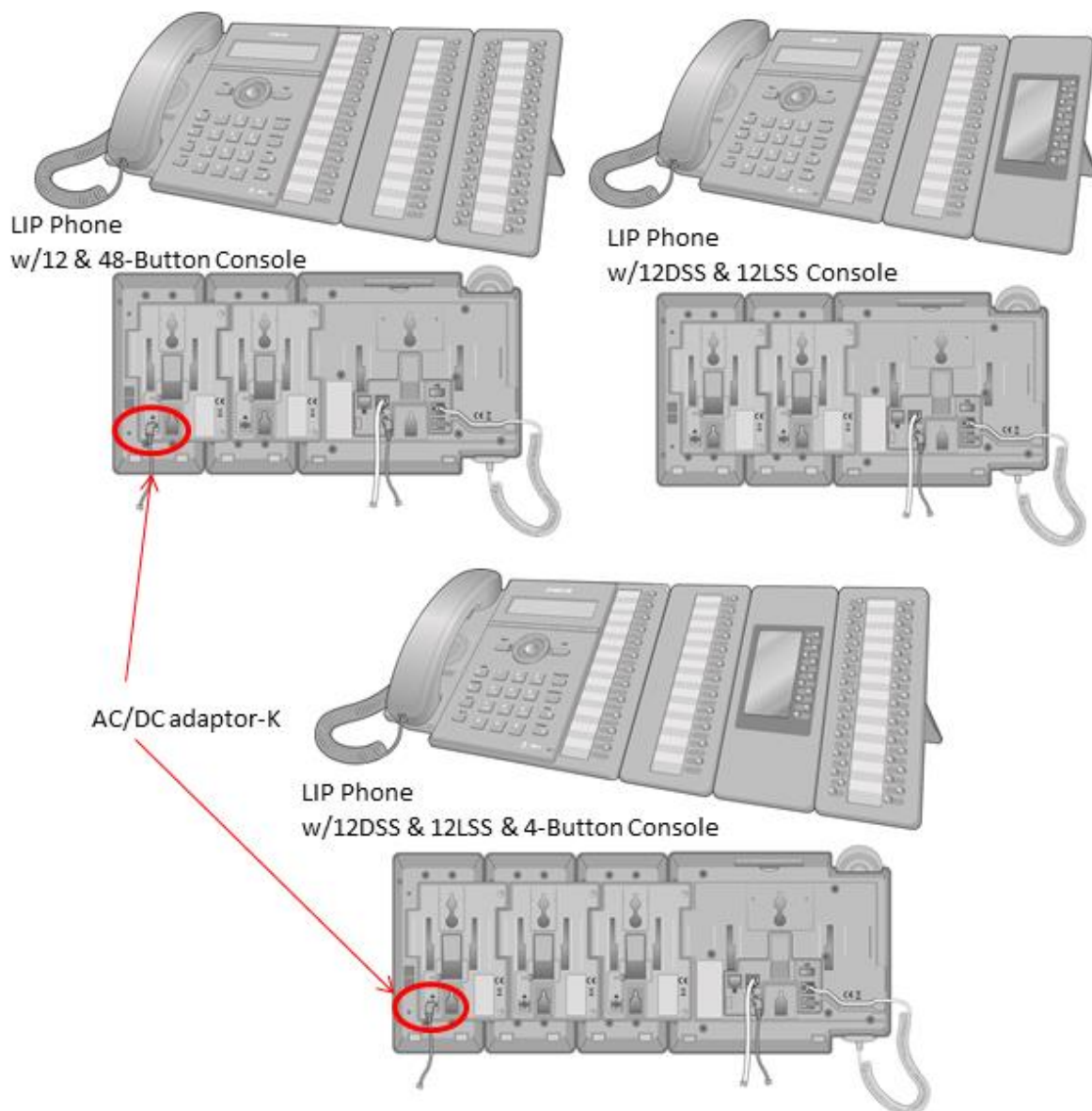
Figure 7.1.2-1 LIP-8000/8000E series Console Configurations

Referring to Figure 7.1.2-2 below use the following instructions to install and wire the LIP Console to the associated LIP Phone.

1) Turn the LIP phone and Console upside down
2) Remove the rubber plug in the LIP phone protecting the Console serial cable connector.
3) Insert the flat ribbon cable from the Console into the connector in the LIP phone.
4) Insert and tighten two (2) screws through the DSS Console mounting flange into the LIP phone.
   Caution: Do not over-tighten the screws as this may damage the LIP phone housing.
5) For additional Consoles, repeat the procedure connecting one console to the previous console.
6) For each LIP-8048DSS and LIP-8040LSS, insert the DC plug of an AC Adaptor-K to the DC input of the Console and plug the AC plug into an appropriate (110/240 VAC) outlet.
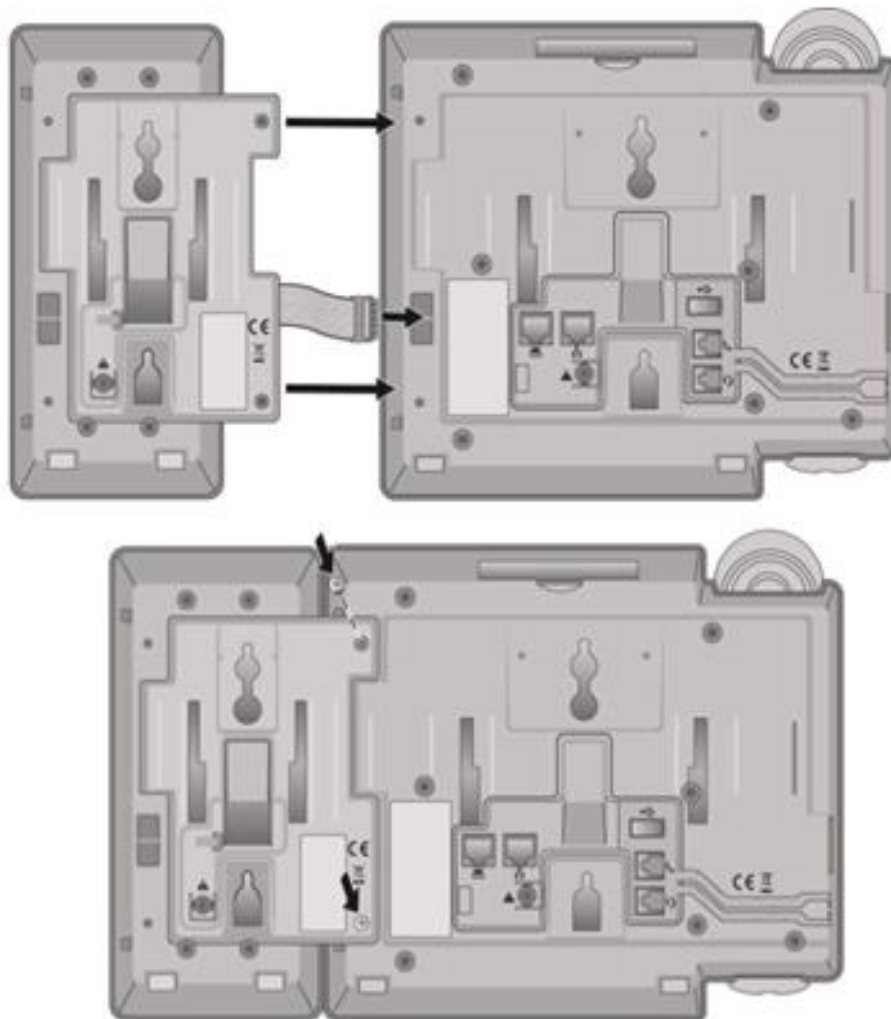

Figure 7.1.2-2 LIP-8000 DSS Installation

7.1.3   LIP-9000 Console Installation

The Button kits for LIP-9000 Series phone provide 12, 24, or 48 additional flexible buttons. The flexible buttons on the Button kit are used as with the flexible buttons on the phone proper and can be assigned for any of the flexible button functions. One of three Button kits may attach to LIP-9020, LIP-9030 or LIP-9040 phone, and can be placed on your desktop or can be wall-mounted with the phone.

The available button kits are shown at the below description and figure.

- **LIP-9012 DSS** has 12 flexible buttons with tri-color LED. The DSS button kit uses a paper label for the button designations.
- **LIP-9024 DSS** has 24 flexible buttons with tri-color LED. The DSS button kit uses a paper label for the button designations.
- **LIP-9024 LSS** has 12 flexible buttons with tri-color LED. The LSS button kit uses an LCD for the button labels and has two flexible button pages to represent 24 total flexible buttons. The two lower buttons control the page view. The page button LED will flash when there is new activity under a button on the page. You can press the page button at any time to change the flexible button page view.
- **LIP-9048 DSS** has 48 flexible buttons with tri-color LED. The DSS uses a paper label for the button designations.
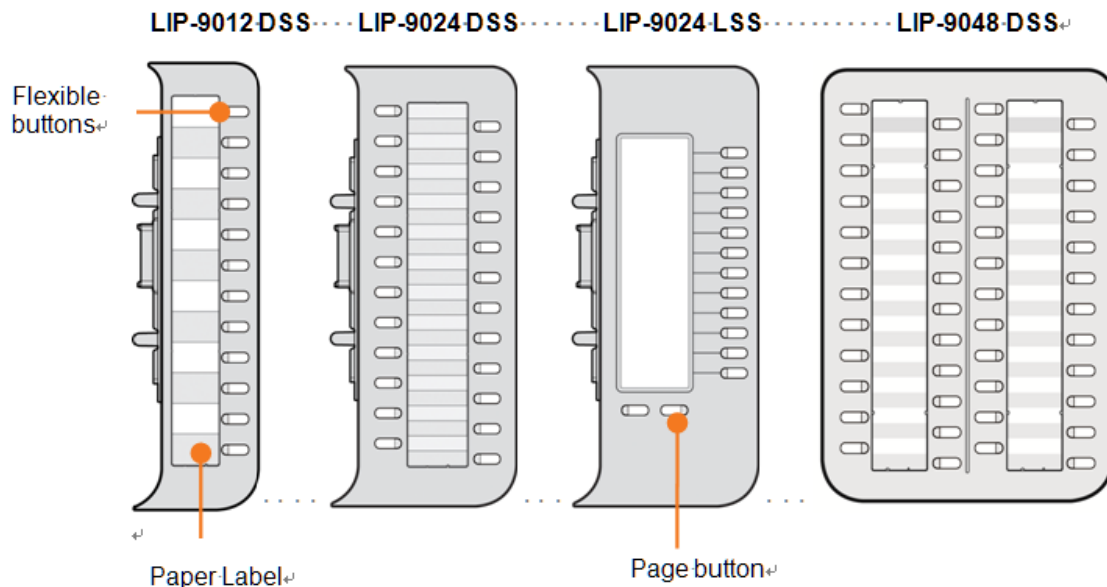
The Button kit should be installed on the phone prior to making any connections to the phone. This simplifies the installation.

To install the button kit for the LIP-9012 DSS, LIP-9024 DSS and LIP-9024 LSS

1) First, assure the phone is NOT connected to power. For convenience, you may wish to remove the handset and foot-stand; this simplifies the Button kit installation.

2) On the right side of the phone, remove the Button kit cover.

3) Align the Button kit and phone as shown in the drawing.

4) Push the Button kit into the phone until the button kit is fully engaged.

5) Insert the screws provided through the screw tabs in the Button kit and tighten the screws into the phone. Do not over-tighten.
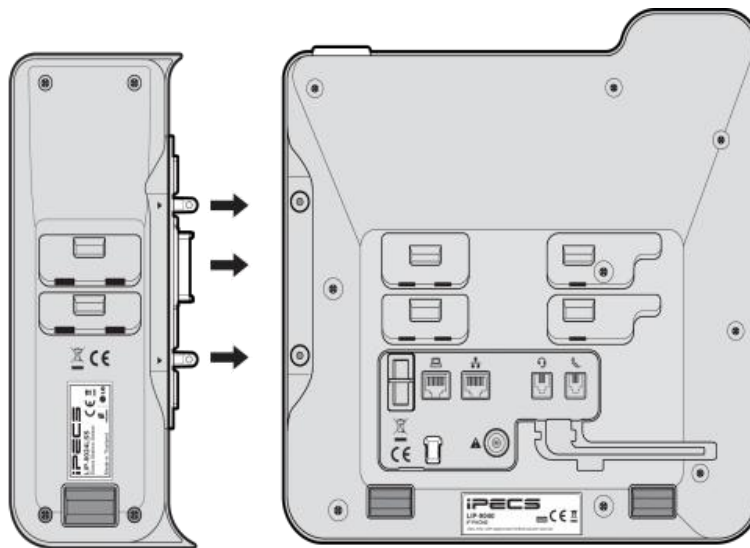
To install the button kit for the LIP-9048DSS

Prepare your LIP-9048DSS for connection depending on the type of LIP phone. The setting switches are hidden on the back of right side of the LIP-9048 DSS. Before you begin, remove protective cover from the LIP-9048 DSS.
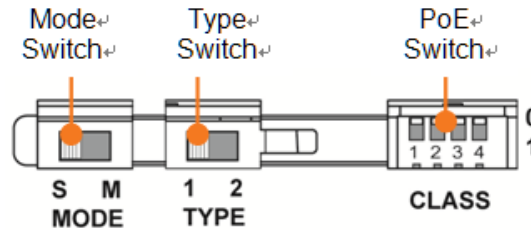
Power Mode
The MODE switch is used to choose the power mode between Slave and Master.

Symbol	Mode	Mode	Description
S	Slave	5V	LIP-9048DSS receives power from another DSS.
M	Master	48V	LIP-9048DSS provides power itself.

Protocol Type
The TYPE switch is used to choose a call protocol type between iPKTS and SIP.

| Symbol	Mode	Description
1	iPKTS	iPKTS protocol type of communication supported.
2	SIP	SIP protocol type of communication supported.

PoE Class
The PoE (Power over Ethernet) Class is indicated the class of the Powered Device (PD), and CLASS switch is used to select the PoE class. DSS module supports all 4 classes listed in below table.

| Class	Power Ranges	Description
1	0.44W to 3.84W	-. One LIP-9048DSS or two LIP-9048DSS
2	3.84W to 6.49W	-. One LIP-9048DSS with a LIP-9020 -. Two LIP-9048DSS with a LIP-9020
3	6.49W to 12.95W	-. One LIP-9048DSS with a LIP-9030 -. Two LIP-9048DSS with a LIP-9030 -. One LIP-9048DSS with a LIP-9040 -. Two LIP-9048DSS with a LIP-9040
4	12.95W to 25.5W	-. One LIP-9048DSS with a LIP-9050 -. Two LIP-9048DSS with a LIP-9050 -. One LIP-9048DSS with a LIP-9071 -. Two LIP-9048DSS with a LIP-9071

- The default switch position is '0'.
- '0' means the power OFF status and it does not support PoE power.
- '1' means the power ON status and it does support PoE power.

Installation button kit

1) Set the power mode, protocol type, and PoE class in advance as described.

2) Make sure that the Joint Bracket is aligned with the side of the LIP-9048 DSS, and insert the one side of the Joint Bracket into the mounting holes and insert the other side of the Joint Bracket into the mounting holes on the side of your phone.

3) Use the provided screws to connect the LIP-9048 DSS and phone firmly together.
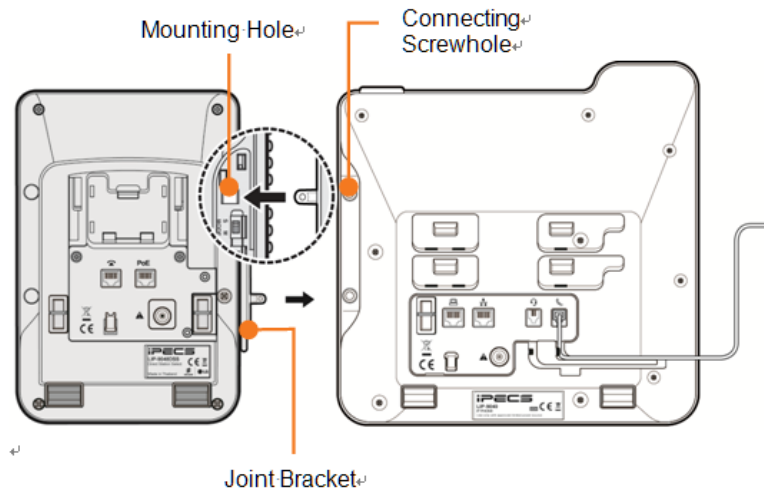
4) At the back of LIP-9048 DSS and phone, remove the rubber plug from the Accessory Expansion Module (AEM) port.

5) Plug the 12-Pin cable into the AEM port on LIP-9048 DSS and phone.

6) Place the Wire Protective Cover behind the LIP-9048 DSS and align the screw holes with the Wire Protective Cover screw holes on LIP-9048 DSS.

7) Tighten the screw to secure the Wire Protective Cover.
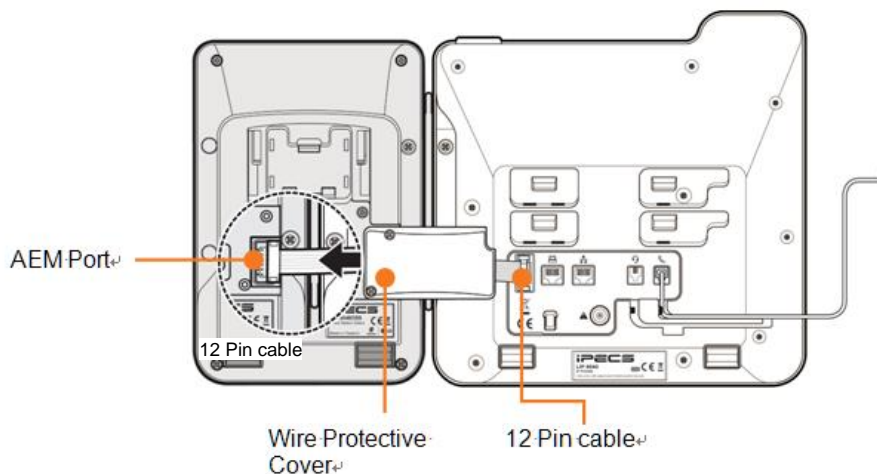
See Button kit for the LIP-9000 Series or LIP-9048DSS Quick Installation Guide for more detailed instruction.

⚠ **CAUTION**

To avoid damaging the Phone or Button kit, remove power from the phone before installing a Button kit.

7.1.4   1000i DSS Console Installation

The 1000i DSS provide 24, or 48 additional flexible buttons. The flexible buttons on the DSS are used as with the flexible buttons on the phone proper and can be assigned for any of the flexible button functions.

All DSS can be placed on your desktop or can be wall-mounted with the phone.

The available DSS are shown in the below and described as follows.

- **1024idss** has 24 flexible buttons with tri-color LED. The DSS uses a paper label for the button designations.
- **1048ilss** has 2x24 flexible buttons with tri-color LED. The LSS uses an LCD for the button labels and has two flexible button pages to represent 48 total flexible buttons. The two lower buttons control the page view. The page button LED will flash when there is new activity under a button on the page. You can press the page button at any time to change the flexible button page view.
- **1048idss** has 48 flexible buttons with tri-color LED. The DSS uses a paper label for the button designations.

[1024idss]

Flexible Buttons
Paper Button Labels
[1048idss]

Page Button
Flexible Buttons
[1048ilss]
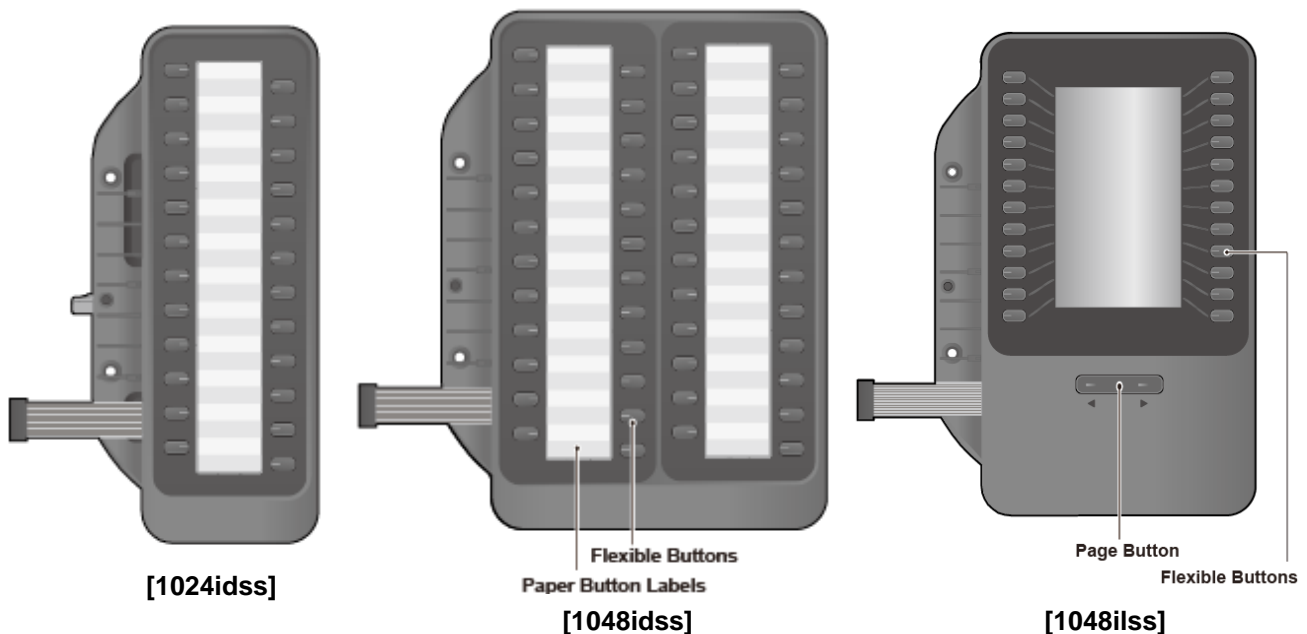
Only one 1024idss can attach to an 1020i, 1030i ,1040i,1050i,1080i phone.

Up to three(iPKTS) / two(SIP) 1048ilss can attach to an 1020i, 1030i ,1040i,1050i,1080i phone, but the 1048ilss cannot use with 1024idss or 1048idss.

Up to four(iPKTS) / two(SIP) 1048idss can attach to an 1020i, 1030i ,1040i,1050i,1080i phone, but the 1048idss cannot use with 1024idss or 1048ilss.

The DSS should install on the phone before making any connections to the phone. The below simplifies the installation for 1030i phone and 1024idss. You can install the 1048ilss and 1048idss in the same way.

For more detailed installation instructions, Scan the QR code printed on the product label of 1024idss or 1048ilss or 1048idss to refer to a Quick installation Guide.

To install the DSS

1) First, assure the phone is NOT connected to power. For convenience, you may wish to remove the handset and foot-stand; this simplifies the DSS installation.

2) Align the DSS and phone as shown in the drawing.

3) Connect the DSS Connecting Cable to the phone.

4) Push the DSS into the phone until the DSS is fully engaged.

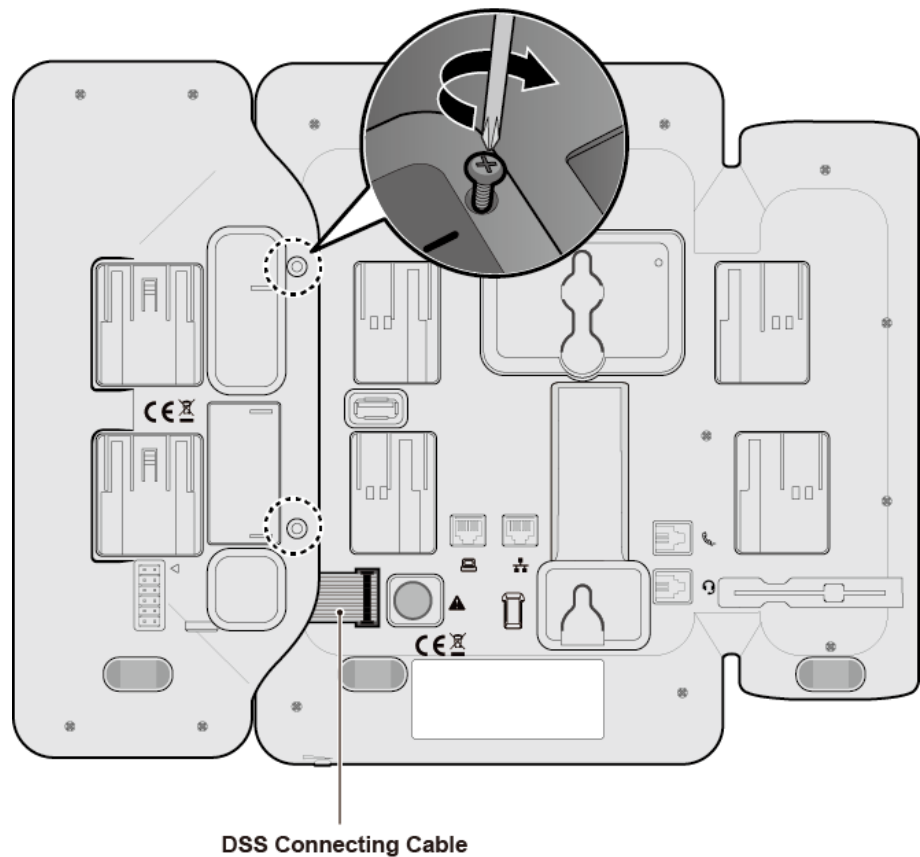5) Insert the screws provided through the screw tabs in the DSS and tighten the screws into the phone. Do not over-tighten.

DSS Connecting Cable

Figure 7.1.4 1024idss Installation

7.2 Terminal Wall Mount

### 7.2.1 LDP-7000/9000/9200 Series Wall Mount

LDP-7000/9000/9200 series phones can be mounted on the wall using the appropriate Wall Mount Kit. The Wall Mount Kit is installed as described below. A separate Wall Mount kit, available from Ericsson-LG Enterprise, is required for LDP-7000 series phones.

1) Using the appropriate Wall Bracket, mark and drill two (2) 7 mm holes for the plastic wall anchors provided.
2) Insert the two (2) anchors into the holes and insert and tighten the 2 screws leaving about 6 mm (¼-inch) exposed.
3) Connect one end of a short cable terminated in RJ11 to the LDP Phone, respectively, and then connect the other end in a wall jack.
4) Mount the Wall Mount bracket on the phone.
5) Slide the Wall Mount bracket over the screws, if loose, tighten the screws slightly and mount the Wall Mount bracket again.
6) Insert the Wall Mount handset hook to prevent the handset from slipping when wall mounted.

7.2.2 LIP-8000/8000E/1000i Series Wall Mount

LIP-8000/8000E series and 1000i phones(except of 1080i) incorporate wall mount into the base of the phone housing. Using the instructions, mount LIP-8000/8000E series and 1000i series phone on the wall. A LIP phone with Consoles can be Wall Mounted after the Console is properly connected to the LIP phone. The 1000i series installation method is same with the LIP-8000 series as below description and figure.

1) Using Figure 7.4.2-1 Mark and drill two (2) 7mm holes for plastic wall anchors.
2) Insert the two (2) anchors into the holes and insert and tighten the 2 screws leaving about 2.5 mm (1/8-inch) exposed. If installing a LIP phone with a Console, also drill anchor holes and insert and tighten screws for the Console Wall Mount slots.
3) Slide the LIP-8000E phone over the screws and assure the phone is secure. It may be necessary to remove the phone and tighten or loosen the screws for a secure mounting.
4) Remove the Handset hook from the phone as shown in the figures below. Reverse the hook and re-install in the LIP-8000E phone so that the hook catches the groove in the handset receiver.
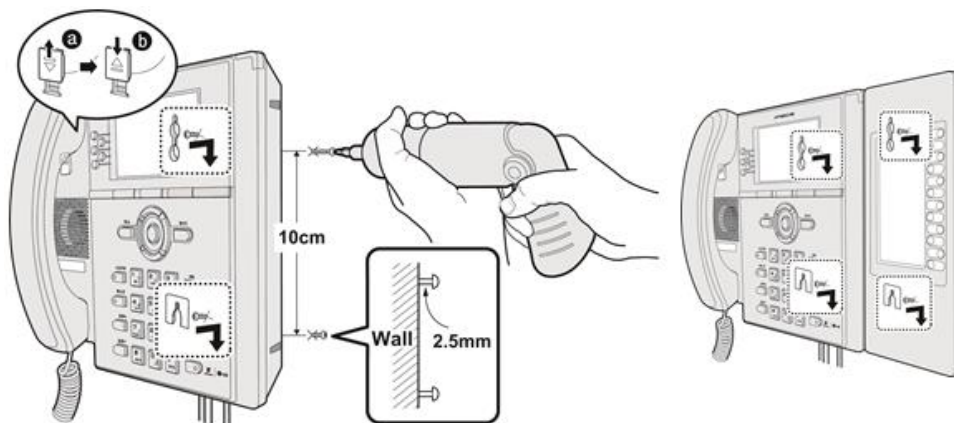
7.2.3   LIP-9000 Series and 1080i Wall Mount

LIP-9000 series and 1080i phones can be wall mounted as needed. The following instructions describe the LIP-9000 wall mount installation. Note the foot-stand must not be installed.

1) If installed, remove the foot-stand from the Phone and Button kit.
2) Connect all wiring to the Phone. Connect the Phone side wiring only.
3) If required, install the Button kit.
4) Align the wall-mount bracket (ordered separately) over the back of the phone, then press the bracket onto the phone applying steady pressure until it clicks into place.
5) (LIP-9000 only) Install the Button kit wall-mount bracket if required, in the same manner as the bracket for the phone.
6) Mark and drill two 7mm holes for plastic wall anchors (not included).
7) Insert the two anchors into the holes and insert and tighten the two screws (not included) leaving about 2.5 mm (1/8-inch) exposed.
8) Align the key holes in the bracket over the screws and slide the phone down assuring the phone is secure.
9) Remove, reverse and re-install the handset hook so that the hook catches the groove in the handset receiver.
10) Hang the handset up on the handset hook.
11) Complete all wiring connections as described in Quick Installation Guide or User Guide.
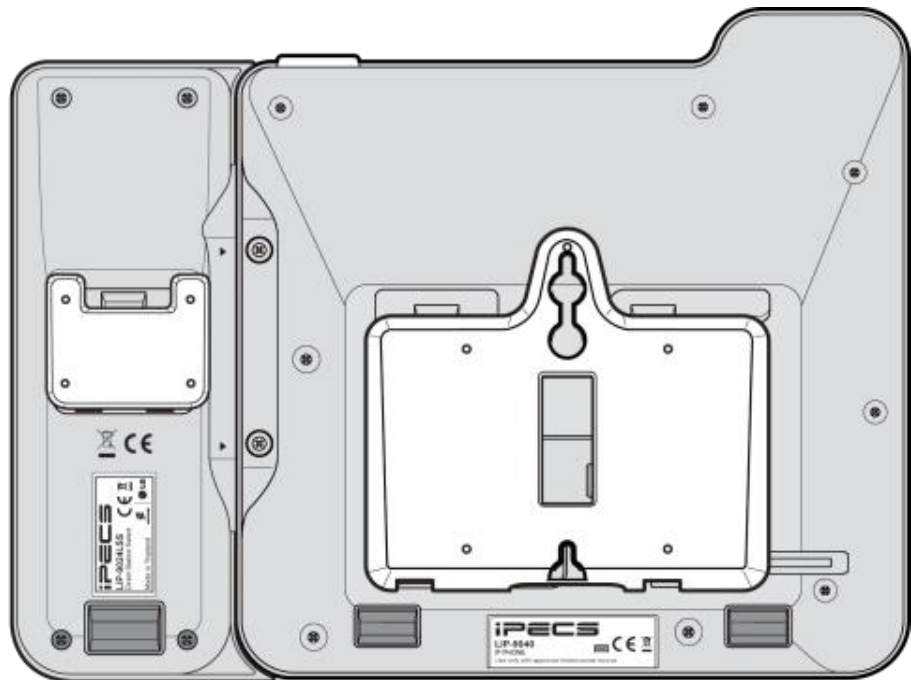
NOTE
It may be necessary to remove the phone and tighten or loosen the screws for a secure mounting.

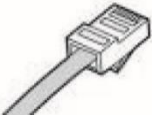## 7.3   Digital Key Telephone Installation

7.3.1   DKTU Wiring

The Digital Key Telephone and digital DSS Console are terminated to a pair of the RJ11 located in the bottom of the unit. The LDP series phones employ the 2nd pair of the modular jack while all other LDP series phones employ the 1st or center pair of the modular jack. The wall outlet for the DKT or Console should be wired to the appropriate termination point for the DTIM ports.

1)   U sing the Modular Jack wiring charts below, wire the 1st or 2nd pair of the wall outlet, as appropriate, to the termination point using UTP cable. Note separate wiring is required for some DSS console (refer to User guide or Quick guide).

2)   Using the line cord provided, connect the DKTU to the wall outlet.

Modular Jack Pin Assignment

Table 7.3.1-1 LDP series Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name
RJ11		1	N/A
		2	Reserved
		3,4	RING, TIP
		5	Reserved
		6	N/A

7.3.2   LDP-7000/LDP-9000/LDP-9200 series Wall Mount

LDP-7000/9000/9200 series phones can be mounted on the wall using the appropriate Wall Mount Kit.

The Wall Mount Kit is installed as described below. A separate Wall Mount kit, available from Ericsson-LG Enterprise, is required for LDP-7000 series phones.

1)   Using the appropriate Wall Bracket, mark and drill two (2) 7 mm holes for the plastic wall anchors provided.

2)   Insert the two (2) anchors into the holes and insert and tighten the two (2) screws leaving about 6 mm (¼-inch) exposed.

3)   Connect one end of a short cable terminated in RJ11 to the LDP series Phone, respectively, and then connect the other end in a wall jack.

4)   Mount the Wall Mount bracket on the phone.

5)   Slide the Wall Mount bracket over the screws, if loose, tighten the screws slightly and mount the Wall Mount bracket again.

6)   Insert the Wall Mount handset hook to prevent the handset from slipping when wall mounted.
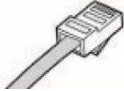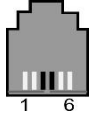
7.4   SLT Installation

7.4.1   SLT Wiring

SLTs are wired to the center pair of the RJ11 jack, typically on the bottom or back of the SLT. The wall outlet should be connected to an appropriate SLT port in the iPECS UCP system.

1)   Wire the center pair of the wall outlet to the termination point using UTP cable.

2)   Using the line cord provided with the SLT, connect the SLT to the wall outlet.

<u>**Modular Jack Pin Assignment**</u>

Table 7.4.1-1 SLT Modular Jack Wiring

Connector	Pin Number	NO	Signal Name
RJ11		1,2	N/A
		3,4	TIP, RING
	1 6	5,6	N/A

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